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NURSING
IN THE
ACUTE INFECTIOUS
FEVERS

BY

GEORGE P. PAUL, M.D.

ASSISTANT VISITING PHYSICIAN AND ADJUNCT RADIOGRAPHER
TO THE SAMARITAN HOSPITAL AT TROY, NEW YORK

Illustrated

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Lane 1885

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PREFACE

THE object of the author in preparing this book is to place before the nursing profession a volume which will be of practical service.

The subject-matter is written for the nurse, and not the medical graduate or scientific worker, hence all extraneous matter and useless discussions are not given place.

The treatment of disease by means of drugs and the physical signs are but little discussed, as these are of more importance to the medical attendant than to the nurse.

Great pains have been taken in preparing the sections on the Care and Management of each disease, as this relates directly to the duties of the nurse.

The book is divided into three parts: The first part treats of fever in its general aspects, which is necessary as a base to the study of each individual fever; the second part discusses each of the acute infectious fevers as to their cause, signs and symptoms, course, prognosis, care, and management; the third part deals with practical procedures and information necessary in the management of the foregoing diseases or of value in understanding the nature and course of such diseases.

Only illustrations and charts of a specific value are included.

Plenty of space is allowed for the addition of individual notes or memoranda, which I consider of inestimable value, for in your daily work many points worthy of record will arise.

The author wishes to express his thanks to Susan D. Munroe, Assistant Superintendent, Samaritan Hospital, for her kind and candid criticism.

G. P. P.

TROY, NEW YORK, FEBRUARY, 1906.

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PART I.

GENERAL CONSIDERATIONS.

CHAPTER I.

FEVER IN GENERAL.

Fever is that condition of the human body in which the temperature is raised above the normal.

The normal body temperature is 98.6° F., but it may vary a little either way, depending upon several conditions.

Physiologically, the temperature of a healthy adult is at its lowest between midnight and four o'clock in the morning. It is at this time, when the body functions are at their lowest, that patients ill with grave diseases are most likely to pass away. The temperature reaches its height between five and eight o'clock P. M., and then gradually decreases until early morning. In persons who toil at night instead of day this ratio becomes reversed and the height is reached in the morning.

The normal temperature is lowered in several ways; insufficient diet may lower the temperature a fraction of a degree. In starvation the temperature may become very subnormal. In certain febrile diseases, either because insufficient nourishment is provided or because the patient swallows but little food, a subnormal tem-

perature may result, especially in the beginning of convalescence. One of my cases of typhoid fever at the beginning of convalescence had attacks in which he would enter a state of collapse, the temperature would become subnormal, the skin pale and moist, but the pulse would remain normal. By careful watching we learned that he would hold the milk in his mouth until the nurse turned her back or left the room, when he would expel it. This he kept up for a week or more, probably getting only a fraction of a glassful of milk in twenty-four hours.

Cold drinks lower the temperature temporarily; cold baths lower the normal temperature. After taking an anæsthetic the temperature is also lower than before; and certain drugs, such as morphine, quinine, large doses of alcohol, coal-tar preparations, as acetanilid, antipyrin, phenacetin, etc., will lower the bodily heat. During sleep the temperature is lower than in the wakeful hours.

The normal temperature is raised after partaking of a liberal diet, or hot drinks; during digestion; by increased function of the large glands of the body; by increased mental activity and muscular exertion. In summer the bodily temperature is a little higher than in winter. Such drugs as strychnine, atropine and caffeine will raise the temperature. This is a very important point, because the continued rise of temperature in the convalescence of certain diseases, as typhoid fever, may be due to the administration of strychnine.

Degrees of Temperature.—The normal temperature is 98.6° F. or 37° C. The normal temperature of an infant is about 99.4° F. and decreasing gradually

to the normal adult temperature as full growth is obtained. After the age of 40 or 50 years the temperature decreases to about 97.8° F. and in advanced age rises again to 99.4° F. Thus in both extremes of life the temperature is about the same and is above normal.

95° F. equals Collapse temperature.

97.5° F. equals Subnormal temperature.

98.6° F. equals Normal temperature.

99.5° - 101.5° F. equals Subfebrile temperature.

102° - 103° F. equals Moderately febrile temperature.

104° - 105° F. equals Highly febrile temperature.

Over 106° F. equals Hyperpyretic temperature.

Detection of Temperature.—This is done by means of the clinical thermometer, the bulb of which is placed under the tongue and the lips closed, the patient being warned not to bite the instrument. The thermometer is left in position from one to five minutes, depending on the grade and sensitiveness of the instrument. As a general rule the temperature is taken by the mouth, but at certain times this is either not possible or desirable. For example, it is impossible to take the temperature in young children by mouth; in adults who are in a comatose or semi-comatose condition; and in insane patients. If the tongue be dry, the recorded temperature will not be accurate, nor if the patient had recently drunk cold or hot water. Other situations for taking the temperature are in the axilla, in the rectum, in the vagina, and in the *passing* urine.

Before placing the thermometer in the axilla, the armpit should be thoroughly wiped and dried. The bulb of the thermometer is then put well into the cen-

ter of the axilla, and the hand of that side placed on the front of the chest so as to completely envelop the bulb of the thermometer with the axillary tissues. The instrument should be allowed to remain in position for five minutes. To the recorded temperature add about 0.5° F., which will bring it up to the oral temperature.

The instrument may also be placed in the rectum or vagina. It is very seldom necessary to use this method except in children, or in adults who are unconscious, delirious, or insane. If used rectally, the rectum should first be emptied of fecal matter, for if the bulb of the thermometer be inserted into a mass of feces, an incorrect reading is obtained. The rectal temperature, when properly taken, is a true index of the degree of body heat.

Another method is by allowing the patient to urinate on the bulb of the thermometer. This is an accurate method, but applicable to only a few cases.

In febrile diseases it is best to record the temperature every four hours during the acute stage of the disease.

Prognosis.—The prognosis of febrile diseases does not entirely depend on the fever, but also on the concomitant symptoms. A fever of 106° F. for a brief period is not as grave as one of 105° F. for a more extended time. An evening temperature of 104° F. in typhoid fever is of more import than a fever of 105° F. in pneumonia.

A temperature of 106° F. if continued for several days is fatal (Smith). In persons over 50 years of age a temperature of 103° F. is serious.

The relation of the pulse is very important in mak-

ing a prognosis. If the evening temperature does not rise above 104° F. and the pulse is good, the prognosis is favorable. In diphtheria a temperature of 101° F. and a pulse of 120 is grave. If the temperature continue at 105° F. for four or five hours in a case of typhoid fever, the prognosis is grave.

Children tolerate a higher fever than adults. A temperature of 104° F. in a child is of the same import as 102° F. in an adult. Disproportion between the surface and mouth temperature is serious.

Sudden and continuous rise of temperature in the course of a disease, if all complications can be excluded, is usually antemortem.

Stages of Fever.—Fever may be divided into three stages; namely, invasion, fastigium, and decline.

Invasion extends from the beginning of the febrile manifestations until the fever reaches its height. It varies in length, degree, and character in various diseases. In typhoid fever the invasion is of about ten days' duration. The fever gradually increases in a step-like manner, with diurnal remissions for seven to ten days, when it reaches its height. In pneumonia, on the other hand, the invasion is very abrupt and of short duration. The fever reaches its height, as a rule, in twenty-four or forty-eight hours.

Fastigium is that period when the fever is at its height, and extends from the end of the invasion to the beginning of decline. In typhoid fever the fastigium is about twelve days long. The evening rise reaches about the same height every day and the diurnal remission is less than the remission during the invasion. In pneumonia the period of the fastigium

is shorter than in typhoid, lasting as a rule, from four to six days, with hardly any remission.

Decline of fever may take place in one of two ways: by *lysis*, that is, a gradual fall of the fever; or by *crisis*—a sudden fall to normal. The principal diseases in which the temperature falls by crisis are lobar pneumonia, typhus fever, erysipelas, measles, relapsing fever, and influenza. In most other diseases the fall is by lysis.

Types of Fever.—All fevers may be placed under three heads: continued, remittent, intermittent. In *continued* fever the temperature remains at a more or less constant height, with little or no daily remission. Examples of this type are lobar pneumonia and typhoid fever. In *remittent* fever, the diurnal remission is marked, but the lowest daily temperature is still above the normal, as in malarial remittent fever and in certain types of tuberculosis. In *intermittent* fever the temperature falls to the normal or subnormal diurnally and again rises, as in malarial intermittent fever, relapsing fever, and certain forms of tuberculosis.

Phenomena of Fever.—Rise of temperature may be the result or the cause of other concomitant symptoms. Among the common accompaniments of fever are headache, malaise, muscular pains, languor, chilly sensations, loss of appetite, coated tongue, tendency to yawn, flushed face, glistening eyes, nausea or vomiting, constipation as a rule, increased rate of pulse and respirations, hot and dry skin. The urine is concentrated, small in amount, dark in color, of high specific gravity and contains albumin.

Treatment of Fever.—There are eight divisions to the proper treatment of fever; namely, neutralize

the poison; promote elimination; reduce the temperature if high; maintain nutrition; stimulate when neces-

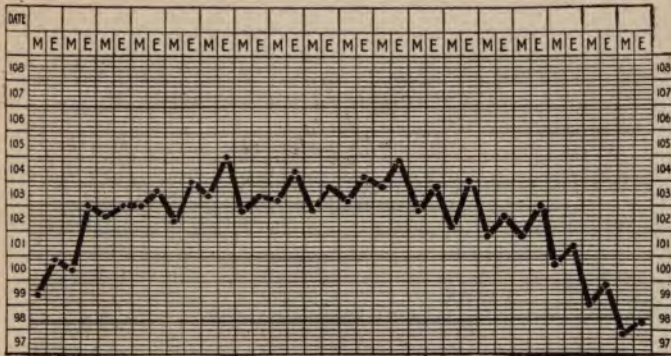


FIG. 1.—Temperature chart of a continued fever.

sary; relieve symptoms; prevent and counteract complications; use care in convalescence.

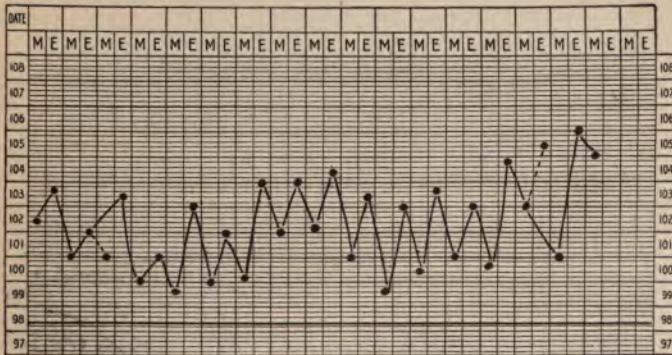


FIG. 2.—Temperature chart of a remittent fever.

Neutralize poisons.—This is very difficult. In those diseases for which we have antitoxins they should be

used early and in sufficient quantity. Hypodermoclysis of normal saline solution is very useful in diluting

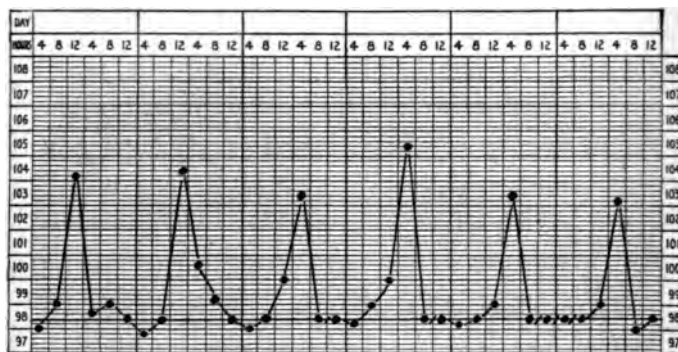


FIG. 3.—Temperature chart of an intermittent fever.

the poisons in the blood and aiding in their elimination. In those diseases in which toxins are formed in the intestinal tract, certain disinfectants as salol, creosote, guaiacol, and thymol are useful.

Promote elimination by the bowels with purgatives and enemata. By the kidneys in giving plenty of water to drink; also rectal infusions and hypodermoclyses of normal saline solution. By the skin with hot packs, hot dry air, and hot drinks.

Reduce the temperature by hydrotherapeutic measures (see subsequent articles) and by means of drugs.

Maintain nutrition by food of proper quality and in proper quantity.

Stimulation and other headings under general treatment will be considered in subsequent chapters.

CHAPTER II.

HYGIENE OF THE SICK ROOM.

Ventilation.—One of the most important considerations of the sick room is its *ventilation*. The refuse or altered products of all substances taken into the body for its nourishment are eliminated as worthless to the human economy and are not to be introduced into the system. This is just as true in regard to the respiratory system. Air rich in oxygen is inhaled; the oxygen is used to maintain the vital processes, and a combustion product, known as carbon dioxid, and certain organic materials worthless to the human being, are exhaled, and are not supposed to return to the body. This makes it necessary to provide a free exit for these substances from the breathing area of the person.

The oxygen of the inhaled air combines with certain elements of the blood and displaces the carbon dioxid of the blood. This latter has been carried by the circulation from the different parts of the body to the lungs, and is eliminated in the expired air, together with a small amount of organic material.

If a person be confined in a closed room, he will in a certain time, depending on the size of the room, have used all the available oxygen of the air and have replaced it with carbon dioxid and organic matter.

These will begin to act as poisons and destroy the life of the person unless he be taken out of the room, or fresh air admitted.

The estimated amount of air space necessary for one person is about 2000 cubic feet with a supply of about 1500 cubic feet per hour.

Now let us consider the sick person. If a fresh supply of air be necessary for an individual who is physically strong and in perfect health, how much more necessary is fresh air to a person whose body is debilitated by illness, whose vital processes are being hampered by high fever and toxins? How necessary is it to give free exit to the expired air, not only containing carbon dioxide and organic matter, but also the products of bacterial life, and in some instances bacteria themselves?

Ventilation of rooms is brought about in several ways. By disproportion between the temperature of the rooms and that outside; by the natural diffusion of gases; by openings allowing the free entrance and exit of air. We will deal only with the last mentioned means.

There is a vast difference between draughts and ventilation. The former are a source of injury but the latter is not only not injurious, but very necessary. Some people think that in order to ventilate a room it is necessary to create a draught.

There are two useful methods of supplying fresh air to the patient. The first is by continuous free ventilation; that is, by having a large supply of air entering the room constantly. The second method consists in having a more limited constant supply, and

then several times a day, after covering the patient's body well and placing a thin cloth over his face, opening the windows widely for a brief time.

In many modern dwellings the system of ventilation

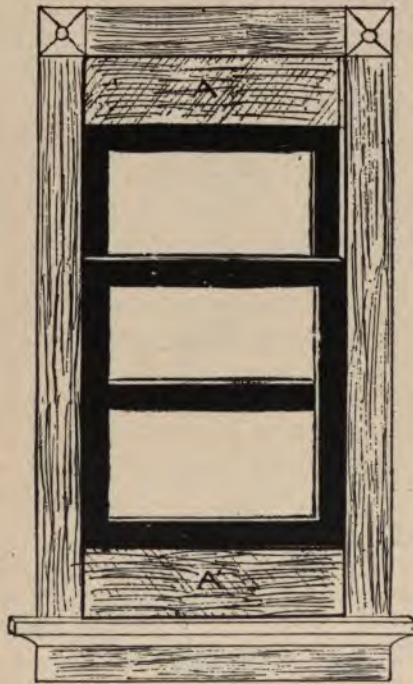


FIG. 4.—Window ventilation. A, A'. Inserted boards.

is perfect and in these cases manipulating the windows is unnecessary, but as a general thing, ventilators in houses are such in name only.

A very practical method of arranging the windows is as follows: Lower the upper sash from three to six inches, raise the lower sash the same distance, and fill in the open spaces, above and below, with pieces of board that exactly fit the window frame. At the center of the window there is then formed an air space between the lower part of the upper pane of glass and the upper part of the lower glass, and this

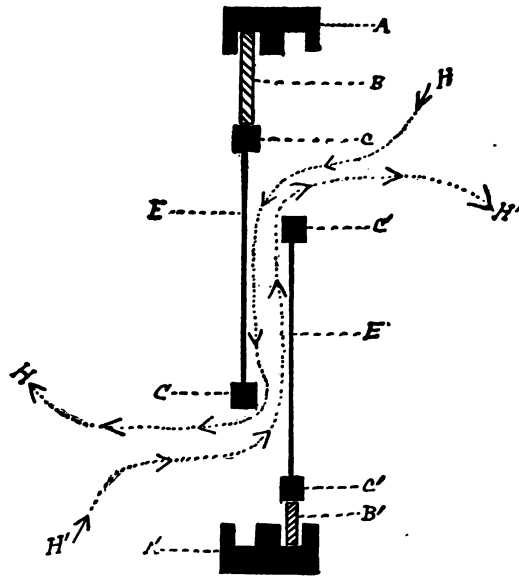


FIG. 5.—Diagram of window ventilation (side view). A, A', window frame; B, B', inserted boards; C, C', window sash; E, E', window glass; H, H', currents of air going in and out.

space communicates both with the outside air and the inside of the room to be ventilated. (See illustrations.)

All kinds of flames, as in stoves, lamps, and gas jets, use up the oxygen of the air. These not only consume that which is of vital importance to the patient, but also vitiate the air with poisonous and oppressive gases. Do not burn more gas or oil in a sick room than is absolutely necessary. It is stated that an ordinary gas burner in use consumes more oxygen in one hour than a person would use in six hours.

Dr. Wm. P. Northrup, of New York, has said: "If you wish to kill a child who is sick with pneumonia, close your windows, start the gas stove, burn a few gas jets, have plenty of friends in the room to help use the air, and have the temperature of the room above 80° F."

We have considered the quantity of air. Of next importance is its quality. The air should be of a certain temperature. If the person be very feverish, the temperature of the room should be between 65° F. and 68° F., and when the temperature of the patient becomes normal or falls below the normal, the temperature of the room should approach 70° F.

Perfectly dry air is very irritating to the respiratory passages, and normally air should be a little moist. In houses heated by hot air furnaces it may be necessary to dampen the air. This is done by hanging in the room towels or cloths dampened with water; or in some cases, especially when the patient is ill with a disease of the respiratory tract, a steaming apparatus is very useful. Moisture may also be furnished by simply boiling water in the room.

The Room and Its Furniture.—The room should be of fairly good size so as to provide plenty of air space. Southern exposure is to be selected if choice

be given. Plenty of sunshine will not only enliven and brighten the patient, but it also acts as a bactericide. The eyes of the patient should not face the bright light. Only such furniture should remain in the room as is absolutely necessary—a bed, one or two small stands, and a couple of chairs. In cases of contagious diseases the pictures and curtain hangings should be removed.

Do not allow unused glasses of water to remain in the sickroom, and plants and flowers should be excluded. A very ill patient will not recognize or appreciate flowers, and if he wishes to see them they might be placed in an adjoining room within the sight of the patient.

The bed clothing should be light in weight for several reasons. It is very uncomfortable for the patient to have very heavy material lying on him, and it may aggravate the fever. A sheet and a thin blanket is generally all that is necessary, except when you raise the windows to ventilate the room, when the patient should be warmly covered.

Quiet.—Quietness in a sick room is very essential. Only those persons whose services are needful should be allowed in the room, and under no circumstances should any person outside of the immediate family and spiritual advisor be permitted to enter the room during the acute course of the disease.

Loud talking and noises of all kinds should be prohibited both inside and outside of the room. All conversation in the sickroom should be carried on in a low, soft voice, but not in a whisper. It is very unwise to converse in the sickroom in such a manner that the patient cannot hear it, for it at once arouses his cu-

riosity and may excite him. If you have anything to say to the physician or attendants which the patient should not hear, postpone saying it until you leave the room.

CHAPTER III.

DIET OF THE SICK.

A *foodstuff* is that substance which, when introduced into the human body, is digested and assimilated, aids in the formation of new tissues, prevents the waste of tissue, or helps in the production of heat and energy.

Food is a collection of foodstuffs to supply those elements necessary to maintain life. The five fundamental foodstuffs are nitrogenous bodies, as proteids, carbohydrates, fats, inorganic salts, and water. The principal elements found in foodstuffs are nitrogen, hydrogen, oxygen, carbon, phosphorus, and sulphur.

The *proteids* contain all the mentioned elements, and serve to form new tissues, supply nervous energy, and create heat.

The *carbohydrates* contain hydrogen, oxygen, and carbon, provide heat or at times form fat, but cannot form other tissues.

The *fats* contain the same elements as the carbohydrates, and perform the same functions.

The *water* and *salts* supply and keep up the normal percentages of these substances in the body.

From what has been said above it will be easily understood that an absolute diet of fats and carbo-

hydrates will not suffice, as these bodies do not supply nitrogen which is necessary for building new tissues. On the other hand, life may be sustained on a diet with these two foodstuffs omitted.

The chief requisites of food are that it be well cooked; that it be in good form; be pleasing to the eye; taste well, and contain in good proportion all those elements necessary to maintain life.

Frequency of Feeding.—In acute infectious fevers food plays as important a part as medicines. It is in these cases that "support" of the patient depends on the food.

During the course of the disease food must be given just as regularly as medicine, every two or three hours being usually frequent enough. About night feeding there is much debate, some authorities not wishing their patients awakened for food. It is an established fact that the vital functions are at their lowest in the early morning hours, and often a glass of milk or other nourishment has turned the tide for the better in adynamic conditions at this time. It is better to give the medicine and nourishment at the same time during the night, so as to avoid frequent awaking of the patient.

Milk.—No one substance forms an ideal food, but of all substances milk comes nearest to being perfect. In milk all the elementary foodstuffs will be found. Proteid in the casein; carbohydrates as milk sugar; fats in the cream; inorganic salts as calcium phosphate, potassium chlorid, etc.; and water represented by the fluid portion.

In fevers milk forms the sole diet. This subject has

been the cause of much debate and good points have been brought up on both sides. Those in favor of a milk diet say that life can be supported indefinitely on milk, that it is not irritating to the intestinal tract, that it leaves very little residue, that it is easily obtained and is cheap, that it is readily digested by most persons and if not, it may be artificially digested. Other authorities say that to many individuals milk is distasteful, it causes the formation of gas and tympanites, that it does not contain in proper proportion the elements necessary to the sustenance of animal life, that the excess of lime salts predispose to thrombi formation, that in order to get sufficient nourishment enormous amounts must be given, which will overburden the digestive apparatus.

The *daily amount* of milk necessary is between three pints and two quarts. If five ounces of milk be given every two hours, it will, as a rule, be sufficient. Many persons cannot take undiluted milk. In these cases the milk may be diluted with lime water, barley water, oatmeal water, or vichy.

In profound conditions the process of digestion must be aided. This may be done by giving pepsin and dilute hydrochloric acid after the administration of the milk, or by digesting the milk wholly or in part (See *peptonized milk* below).

It is often necessary when nursing children are taken ill with a contagious disease, to cease feeding them with the milk from the mother's breasts, and to modify cow's milk so that it will approach the composition of the mother's milk. Following will be found a convenient scheme for modifying cow's milk.

MODIFICATION OF COW'S MILK FOR INFANT FEEDING.

I. Compositions of the Various Milks.

	PERCENTAGE OF		
	FAT.	SUGAR.	PROTEID.
(a) Cow's Milk,	4	4	4
(b) Gravity Cream,	16	4	4
(c) Human Milk (high)	4	7	2
(d) Human Milk (low)	3	6	1

II. Feeding at Various Ages.

(a) Birth to 1st Month	1	6	1
(b) Birth to 1st Month	2	6	1
(c) Birth to 1st Month	2	6	0.66
(d) 2nd to 4th Month	3	6	1
(e) 4th to 12th Month	4	7	2
(f) After 12th Month	4	4	4

III. Daily Feedings and Amount of Milk.

- (a) 1st Month, 8 Day and 2 Night Feedings, each
2 Ounces.
- (b) 2nd Month, 8 Day and 1 Night Feeding, each
3 Ounces.
- (c) 3rd Month, 8 Day and 0 Night Feedings, each
4 Ounces.
- (d) 4th Month, 7 Day and 0 Night Feedings, each
5 Ounces.
- (e) 6th Month, 6 Day and 0 Night Feedings, each
7 Ounces.
- (f) 10th Month, 5 Day and 0 Night Feedings, each
8 Ounces.

IV. Total Daily Amount of Milk.

- (a) 1st Month, 20 Ounces.
- (b) 2nd Month, 27 Ounces.
- (c) 3rd Month, 32 Ounces.

(d) 4th Month, 35 Ounces.

(e) 6th Month, 42 Ounces.

(f) 10th Month, 40 Ounces.

V. Methods of Obtaining the Various Compositions.

(a) Formula 1-6-1.

	Parts.	Fat.	Sugar.	Proteid.
Milk,	(2)	8	8	8
Boiled Water,	(6)	0	0	0
	(8)	8	8	8
		1	1	1
Sugar of Milk 5%,			5	
		1	6	1

(b) Formula 2-6-1.

Milk,	(2)	8	8	8
Gravity Cream,	(1)	16	4	4
Boiled Water,	(9)	0	0	0
	(12)	24	12	12
		2	1	1
Sugar of Milk 5%,			5	
		2	6	1

(c) Formula 2-6-0.66.

Gravity Cream	(2)	32	8	8
---------------	-----	----	---	---

Milk,	(1)	4	4	4
Boiled Water,	(15)	0	0	0
	(18)	36	12	12
		2	0.66	0.66
Sugar of Milk 5%,			5	
		2	6(—)	0.66

(d) Formula 4-7-2.

Gravity Cream,	(1)	16	4	4
Milk,	(2)	8	8	8
Boiled Water,	(3)	0	0	0
	(6)	(24)	12	12
		4	2	2
Sugar of Milk 5%,			5	
		4	7	2

(e) Formula 3-6-1.

Gravity Cream,	(2)	32	8	8
Milk,	(1)	4	4	4
Boiled Water,	(9)	0	0	0
	(12)	36	12	12
		3	1	1
Sugar of Milk 5%,			5	

VI. An Example: The child is four months old and must be fed artificially. How will the nurse pre-

pare the milk? Tables II and III tell me that a child of four months will require 7 day feedings, each of 5 ounces of a milk whose composition is 4-7-2. Table V (d) says this formula is made by taking 1 part of gravity cream, 2 parts of cow's milk, 3 parts of boiled water and 5% of milk sugar.

Table IV shows that the amount to prepare for one day is 35 ounces. Therefore, take of gravity cream, 1 part or 5 5-6 ounces; of cow's milk, 2 parts or 11 2-3 ounces; of boiled water, 3 parts or 17 1-2 ounces; of milk sugar, 5% or 1 3-4 ounces. It is best to replace part of the water with lime water (2 or 3 ounces).

Eggs contain all elements, but the amount of carbohydrates is very small. Eggs in the form of egg water or albumen water (see below) are very useful in fevers; also as egg nogs, punches, and prepared in various ways.

Meats are rich in nitrogenous material, and are useful chiefly in the forms of broths, consomme, etc.

Meat broths have a tendency to cause diarrhea when given in fevers. For various meat recipes see below.

Below is appended the recipes for preparing foods useful in the course or convalescence of fevers.

RECIPES FOR SICK DIETARY.

Barley Water.—(I) Mix one tablespoonful of barley flour with four tablespoonfuls of cold water, make a smooth paste free from lumps. Pour this into a pan containing one pint of boiling water and stir while boiling for five minutes.

(II) Place one tablespoonful of pearl barley in a pan and add one pint of cold water and boil for a few

minutes, then pour off the water and replace with one and one-half pints of clean water and allow it to simmer gently for one hour. Strain.

Oatmeal Water.—To one pint of cold water add one tablespoonful of oatmeal and boil for three hours. Replace water as it boils away, and then strain.

Arrowroot Water.—Make a paste of two tablespoonfuls of arrowroot powder with a small amount of cold water; then add gradually, stirring constantly, one pint of cold water. Let it simmer for five or ten minutes.

Albumen Water.—Strain the whites of several eggs through a cloth, add an equal amount of cold water, and stir well. A little lemon juice and salt may be added to taste.

Toast Water.—Toast to dark brown, but do not burn, three slices of dry bread. Place in a dish and pour over them two pints of boiling water. Cover well and let stand on ice until cold; then strain and add sugar and flavoring agents.

Rice Water.—Place two tablespoonfuls of cleaned rice in one quart of boiling water, and let simmer for two hours. Strain and add salt.

Flaxseed Tea.—Take of whole flaxseed one ounce, sugar one ounce, licorice root one-half ounce, and lemon juice one ounce. To these add one quart of boiling water and allow the whole to stand in a hot place for four hours. Strain and use.

Raw Meat Juice.—Mince finely one pound of lean beef and place in a vessel with sufficient cold water to cover it. Let stand for four hours and strain through cloth.

Wine Whey.—Bring one pint of milk to the boiling point and add one gill of sherry wine. Allow to stand in a warm place for ten minutes and strain. Lemon juice may be used instead of wine.

Milk Punch.—To a glass of milk add two teaspoonfuls of brandy or whiskey, and sweeten to taste.

Egg Nog.—An egg is beaten well with a glassful of milk, and while stirring add a half-ounce of brandy or whiskey.

Kumiss.—(I) Dissolve a half ounce of sugar in three ounces of water and twenty grains of yeast in three ounces of milk. Pour both into a bottle and add milk to make one quart. Cork and wire the bottle tightly, shaking at intervals daily for four days.

(II) One quart of fresh milk, one-third of a cake of compressed yeast, one tablespoonful of sugar. Mix the yeast with a little warm water, add the sugar to the milk, which should be lukewarm, then add the yeast and stir well. Bottle as above and set in a warm place for twelve hours; then, after placing inverted on the ice for twelve hours, it is ready for use.

Peptonized Milk.—To a pint of milk add five grains of pancreatin and twenty grains of sodium bicarbonate which have been dissolved in one ounce of water. Keep at a temperature of 110° F. for one hour, then raise to the boiling point for a moment, and place on ice.

Peptonized Beef Tea.—To one pint of beef tea add pancreatin and sodium bicarbonate as in peptonized milk, and keep at 100° F. for three hours; then strain and boil for one minute.

Peptonized Oysters.—To one-half pint of oysters which have been finely minced, add pancreatin and sodium bicarbonate as in peptonized milk, keep at a temperature of 100° F. for one hour, then add one pint of milk and keep at the same heat for another hour. Boil for one minute, strain, and salt to taste.

Peptonized Toast.—To one piece of toast, cut in small pieces, add one pint of milk and mince thoroughly; then add pancreatin and sodium bicarbonate as in peptonized milk. Raise to 100° F. for two hours, then boil for a moment, and strain or not according to the condition.

CHAPTER IV.

REDUCTION OF FEVER.

Fever is reduced by two methods, the use of drugs and by hydrotherapy. The first method we will not consider.

Hydrotherapy is the use of water in the treatment of disease. Water is applied to the body in two ways, the *mediate* and the *immediate*. By the first method the water does not come in contact with the body as it is applied in receptacles made of rubber or water-tight tissues. By the immediate method the water is brought in direct contact with the skin.

Mediate Method.—The *ice-bag* is probably the most common form of mediate application. These bags



FIG. 6.—Ice-bag (Ashton).

are made of thin rubber, or may be improvised at home by using the dried bladder of a pig or sheep. This makes a very good substitute for the rubber bag.



FIG. 7.—Cold Water Coil. The flow of water from the higher to the lower vessel is caused by suction. The flow is started by the use of a piston syringe, inserting the nozzle of the syringe into the end of the outflow tube. The water collected in the lower vessel should be poured back into the upper vessel before this latter vessel is empty. Ice should be kept constantly in the upper vessel.

Into the receptacle place a quantity of ice which has been cracked finely. Do not place too much ice in the bag as it makes it very bulky and heavy, and it becomes a burden to the patient. It is very difficult to get a good ice bag as most of them will soon leak at their necks.

Instead of using ice, ice water may be used, but this method requires frequent changing as the water quickly becomes warm.

Another similar method is that known as the *ice poultice*. Powdered ice is mixed with sufficient sawdust to prevent dripping of water and the mixture is placed in a flannel bag and covered with oiled silk or oiled muslin.

The *cold water coil* is a very good form for applying cold by the mediate process. This consists of a great length of small-caliber rubber tubing coiled in various shapes, depending on the part of the body for which it is to be used. A certain length at either end of the tube is not coiled, one end being used as an entrance for the water and the other as an outflow. The coil is applied to the body, particularly the abdomen, chest, and head, and the inflow end of the tube is placed in a pail of ice water elevated above the level of the body of the patient. The outflow end is placed in an empty pail on the floor. The water is started flowing by suction on the outflow end. When the upper pail has been relieved of its water it is refilled from the lower pail. (See Fig. 7.)

The *water bed* consists of a large rubber mattress in which cold water is placed and the patient allowed to lie on it. This method is not frequently used.

Immediate Methods. — *Sponge bath* is applying the water directly to the skin by means of a moistened sponge. The secret of giving a serviceable sponge bath is that the sponge should *not* be dripping with water but only moderately dampened, so that when it is rubbed over the surface of the body it leaves a thin layer of water on the skin. If only a thin layer is allowed to remain it evaporates very quickly and thus causes a loss of heat from the body. Many individuals cannot stand sponging of an extensive area of the body at once. In these cases only a small portion of the body should be bathed at a time, and then carefully covered and another part sponged.

It is very important that the back of the patient's body should be thoroughly sponged as these thick parts hold a great amount of heat; and further, it is in these parts that passive congestions occur.

It is also very essential to keep the circulation of the surface of the body in an active state by constant rubbing, so as to avoid collapse and to aid in greater loss of heat, because if the capillaries of the skin be contracted, little heat is lost. After completing the sponge bath if the surface of the body be rubbed with alcohol, the patient becomes very comfortable.

Bed Bath. A large rubber sheet is placed under the patient so that he lies in the middle of it; then two blankets are rolled so as to form two good-sized rolls and these are placed under the rubber sheet, one on each side of the patient and running parallel so that the patient lies in a trough. A pillow is then placed under each end of the rubber sheet so as to complete the tub. (See Fig. 8.)



FIG. 8.—Bed Bath Arrangement. One corner of the rubber cloth is pulled back to show the rolls of blankets forming the sides of the trough. A sheet is placed on the bottom of the trough to prevent the body of the patient coming in contact with the rubber cloth.

The pillow at the head of the tub will serve as a support to the head of the patient. The water is now poured over the patient until sufficient has collected in the sheet. The patient is rubbed constantly,—this is very important. When the bath is completed allow the water to run into a pail by removing a part of the foot pillow and holding the pail so as to collect the water. Then remove the rubber sheet and wrap the patient in a light blanket.

Tub Bath. By some physicians this form of bath is used exclusively, but others seldom use it except for very robust patients. The shock of tub bathing is very great, and nervous individuals who may be helped by sponge bathing are rendered infinitely worse by tubbing.

The patient is placed in a tub of water directly, or first placed upon a sort of stretcher and the whole lowered into the water. Some authorities advocate placing the patient in warm water and gradually lowering the temperature of the water to the required coolness. Others prefer to place the patient at once in the water at the required temperature, and at each successive bath have the water colder. The former claim that by first placing the patient in warm water shock is avoided; whereas the latter hold that it is this shock to the nervous system that is beneficial.

While the patient is in the water he should be constantly rubbed so as to keep the cutaneous surface in a glow. Account of the temperature of the patient should be kept and it should never be reduced below 100.5° F., because the patient may go into collapse later, the temperature continuing to fall for some little time after the bath.

If an ice bag be kept on the head of the patient while he is in the water, troublesome cerebral congestion will be avoided. Before or after a bath, or at both times, a transient stimulant as brandy, whiskey, spirits of ammonia or the spirits of ether, may be given.

Cold packs are partial and complete. The partial cold pack consists in wringing out several thicknesses of old muslin in cold water and wrapping them around the chest and abdomen of the patient.

In the complete form the entire body of the patient, except the head, is wrapped in a sheet which has been wrung in cold water. As the sheet becomes warm or less wet, cold water should be poured or sprinkled on. It is very important that the excess of water be drained away so the patient does not lie in pools of water. As in other forms of baths the patient should be constantly rubbed.

Another but infrequent method of applying cold water is by means of rectal enemata. This is a very good form but great care must be used as the abstraction of heat may be very rapid.

Use of Baths.—A majority of nurses, if they were asked what is the use of baths, would invariably answer that they are used only for the purpose of reducing the temperature. This is one of the least benefits of a cold bath. Although the reduction of the temperature is a very important result of the bath, there are other effects of greater weight. After cold baths, whether the temperature be reduced or not, the patient becomes tranquil, delirium is quieted, restlessness is assuaged, the nervous system is toned, headaches are relieved, insomnia is overcome, and the pulse becomes steadier.

Temperature of Baths.—

Hot,	110° F. to 100° F.
Warm,	98° F. to 88° F.
Cool,	88° F. to 70° F.
Cold,	70° F. to 50° F.

Notes on Bathing.—It is not wise to continue a bath more than from twenty minutes to a half-hour. Do not reduce the temperature of a patient below 100.5° F. as collapse may result. Do not wait for the time or temperature limit if the patient become depressed or enters collapse, but remove the patient at once and apply stimulants.

CHAPTER V.

ALLEVIATION OF SYMPTOMS.

In this section the medicinal or drug treatment of disease will not be considered, it being left to the discretion of the attending physician. Only such treatment will be discussed as a nurse may employ in the absence of the physician. Not only symptoms but also some of the complications will be given attention.

Bed sores occur in all diseases in which prolonged rest in bed is necessary. They are very common in some diseases, especially typhoid fever.

They are due to interference with the circulation, as the result of pressure, and hence the nutrition of the skin is cut off, a sore resulting. They occur most frequently over the bony prominences. Moisture acts as an exciting agent; also hard particles on the sheets, such as crumbs. Creases in the bed clothing and depressions in the mattress tend to aggravate the sores.

The treatment of this common occurrence is two-fold: preventive measures, curative measures.

Preventive measures must, of course, be used before the formation of the sores. Cleanliness is paramount, and frequent changes in the position of the patient are essential. Do not allow a patient to lie too long in any one position. A change of position is restful.

Hardening of the skin is a most important preven-

tative. This is augmented by bathing those parts of the body where bed sores are usually formed, with various hardening and astringent solutions. Dilute or full strength alcohol (not absolute alcohol) are very good agents, or a solution consisting of whiskey and common salt (1 to 753). Vinegar is very useful. A simple and handy way is to take a slice of lemon and rub this over those parts that might be affected, repeating daily. This will prevent bed sores, when other methods fail. Solutions of alum and tannic acid have been used.

Curative Measures.—After sores have formed active treatment is necessary. The sores should first be thoroughly cleansed with a solution of peroxid of hydrogen or bichlorid of mercury (1-5000) and then dressed dry with some dusting powder, as bismuth subnitrate, aristol, or stearate of zinc. If the sores show signs of indolency, touch them with a stick of silver nitrate and dress with ichthyol or balsam of Peru.

Constipation is the rule in most febrile diseases and is due to numerous causes, among which are the prolonged rest in bed, the diet of milk, and in some cases the medication.

The constipation is best relieved during the acute course of the disease by means of enemata, of which there are several kinds. (For the composition of enemata see that section in the Addenda.)

Convulsions occur frequently in children ill with infectious fevers. The very best and rapid method of overcoming convulsions is to place the child in a hot mustard bath. If the child's temperature be very high, this may be the cause of the convulsion. Then cold

water may be poured over the child while in the bath. If there be any reason to believe the attack to be due to meningitis, apply ice to the head.

An enema should be given if the child were previously constipated.

Diarrhea may be very troublesome, especially in typhoid fever. Most authorities say that when the movements of the bowels number more than six in one day, active treatment should be begun.

In many cases diarrhea can be controlled by applying a mustard plaster to the abdomen. In some instances it may be necessary to wash out the lower bowel by means of a normal saline solution. A rubber tube or catheter of large caliber is introduced high in the rectum and the solution allowed to flow in from a fountain bag. Free exit for the returning solution must be provided by the introduction of a second catheter of smaller caliber than the inflow one.

Ice water injections have been advocated by some but should be reserved for very strong individuals.

Starch and laudanum enemata. (See Addenda.)

Delirium occurs in two forms—the *active* and the *low muttering forms*. In the former the patient becomes more or less maniacal and wild. This is rare in the infectious fevers, and as a rule the patient is one who has been addicted to the use of alcoholic beverages.

The active form is combatted by powerful sedative drugs. The low muttering form of delirium is best treated by hydrotherapeutic measures, as baths, packs, etc.; also by alcoholic stimulation.

Disorders of the Tongue and Mouth.—In all cases of febrile disease careful attention should be paid to

the mouth, tongue, and teeth. The latter should be kept thoroughly clean. The mouth is to be cleansed several times daily by swabbing it with cotton or gauze wet with some antiseptic solution. A very useful solution consists of glycerine, 5 parts; lemon juice, 1 part; hydrogen peroxid, 5 parts; water, 25 parts. A solution of boric acid or borax may be used or a diluted solution of hydrogen peroxid.

Fever.—See special chapter.

Headaches are very common in the onset of all infectious fevers, and are very annoying to the patient. An ice bag applied to the head will relieve the majority of headaches. A cold bath or pack are useful in some instances. If the bowels are constipated, an enema will be of great service. A mustard foot bath often gives good results.

Hemorrhage from the Bowels.—This occurs as a complication of typhoid fever in over four per cent of cases. It is a serious occurrence and demands prompt and active treatment. The signs and symptoms of intestinal hemorrhage are discussed in the chapter on Complications.

The attending physician should be notified at once. In the meantime apply an ice-bag to the right iliac region of the abdomen; stop all nourishment by mouth and enforce absolute quiet. Prepare for giving a hypodermic of morphin in case the physician might wish it; also get the apparatus and solutions ready for giving a hypodermoclysis.

Hemorrhage from the Lungs.—In pulmonary disease, especially in ulcerative tuberculosis of the lungs, hemorrhage is of somewhat frequent occurrence.

The treatment is similar to that for hemorrhage from the bowels. Place an ice-bag on the chest and prepare for a hypodermic of morphin, and for a hypodermoclysis if the bleeding has been profuse.

Hemorrhage from the nose or epistaxis may be very severe and persistent in typhoid fever and other infectious fevers. It is best combatted by first applying warmth to the feet by means of hot water bags or a hot mustard foot bath. Hot water bags should also be applied to the back. Ice, or cloths which have been on ice, are applied to the root of the nose. Spray or douche the nose with vinegar or diluted lemon juice. Douching the nose with very warm saline solution is as useful as any method.

Insomnia is a frequent and very troublesome symptom of the infectious fevers. If the temperature be high, a sponge bath with cool water, or an alcohol rub will relieve the feverishness, quiet the nervous system, and be productive of good results. At times a sponge with tepid or warm water will be more useful than with cool water. A hot foot bath, or hot water bottles applied to the feet are also good. An ice-bag to the head may be used in conjunction with this method, or alone.

In many cases a hot drink before the hour of sleep will aid in the production of sleep.

Nephritis occurs often as a sequel of scarlet fever and erysipelas (see Complications) and is of grave import. The indications are to restore the functioning powers of the kidneys and to relieve them of part of their duties. This latter is obtained by increasing the elimination of water by the skin and bowels.



FIG. 9.—Hot Air Bath Arrangement. Part of covering blanket is raised to show the arrangement of the apparatus.

Increased elimination of water by the skin is brought about by augmenting the excretion of sweat. The patient should be placed between blankets with plenty of hot water bottles about him. Sweating may also be increased by giving the patient a hot air bath. Introduce under the blanket in which the patient is wrapped, the end of a tin pipe, the other end of which contains an alcohol lamp placed on the floor. (See Fig. 9.) If sweating does not occur, it may be hastened by administering a drink of cold water.

When applying heat to an extensive surface of the body it is well to have an ice bag on the head to prevent cerebral congestion or heat stroke.

Plenty of water must be introduced into the system as this aids in the return of power to the kidneys and also flushes them of irritating material and toxins. Water may be introduced by drinking or by saline infusions per rectum or by hypodermoclysis. The bowels should be moved by the aid of calomel or epsom salts.

Pains in the back are very troublesome in influenza. The application of strong mustard paste, hot water bags, or an ice-bag are useful.

Pains in the joints are the most annoying symptoms in rheumatism. The applications for local control of joint pains are varied and numerous. Every physician, nurse, and housewife has many original pain-killers. The following are a few of the many and are the best:

A very good application consists in oil of gaultheria, one ounce; salicylic acid, one dram, and cotton seed

oil, twelve ounces. Apply to joint and cover with soft woolen cloths and oiled muslin.

A mixture of equal parts of guaiacol and glycerin applied as above is very useful. Ichthyol, either pure or as a fifty per cent ointment. Hot cloths saturated with the lotion of lead and laudanum. Chloroform liniment is good.

A most excellent method is the application of an ice bag. The mention of this is disagreeable to the patient, but after a few minutes application the pain becomes easier and the patient more comfortable.

A method used by some physicians is to make woolen bags and place a moderate amount of powdered sulphur in each and draw them over the affected limb and shake them so that the sulphur gets over the surface of the limb. Allow the bags to remain on for a few days. This method acts better in the subacute cases.

Peritonitis.—The application of a light ice bag to the abdomen is the best.

Pleurisy or "Stitch in the side," when it occurs, is very annoying to the patient. A hot water bag or a mustard plaster placed over the area will generally give relief. An ice bag is fully as good as the hot water bag, and in many cases it produces the best of results. The application of an ice bag is repulsive to most patients but as they soon learn the great results obtained from its use they do not object after the first application.

Tincture of iodine painted over the area of pain is very useful. A belladonna plaster does good in some cases.

Sore Throat is troublesome in some of the infectious fevers, especially in scarlet fever and diphtheria.

External applications to the throat of heat and cold, especially the latter if the patient will submit to it, should be used.

For internal use, that is, as gargles or for swabbing the throat, the following are useful: Hydrogen peroxid solution (1 to 3). Solution of boric acid (1 to 25). Tincture of chlorid of iron one dram, glycerin one ounce, and water to two ounces.

Sweating of a profuse type occurs in some cases of typhoid fever, usually due to exhaustion or sepsis; in tuberculosis pulmonalis and acute rheumatism. Sponging the body with the following solution is very good: Alum one-half ounce, alcohol two ounces, water sixteen ounces.

A wash of vinegar or of one dram of sulphuric acid to one pint of water, is often valuable.

Tympanites is especially prominent in typhoid fever. The abdomen sometimes reaches a great size, and the tympanites becomes a very serious complication.

Intestinal antiseptics administered by mouth aid greatly in decreasing the distention. Of all drugs used turpentine stands in the first rank. It should be used internally and externally.

Externally it is used in the form of stupes. For instructions on making these see the article on Topical Applications. A turpentine enema is of very great help in expelling gas. (See section on Enemata.)

Turpentine used externally is absorbed to a certain extent and a continuous use of it may be followed by toxic effects. Careful watch must be kept to detect the onset of poisonous symptoms. Turpentine is irri-

tating to the kidneys, and the urine is a means of detecting its ill effects. The odor of the urine becomes like that of violets; later the urine may become cloudy and bloody. Cyanosis may occur. In many persons it will cause a diffuse, red eruption of the skin.

Asafetida is very useful in aiding the escape of flatus, if given as an enema. (See Enemata.)

Vomiting is a very distressing symptom and at times it seems almost uncontrollable. In many of the most severe and protracted cases simple measures have brought about the best results. An ice-bag placed on the back, epigastrium, or nape of the neck is of service. A mustard poultice over the epigastrium works marvels. Cracked ice with whiskey or champagne is beneficial. Lime water added to the milk relieves the stomach in many instances.

Inhalations from a cloth wet with vinegar, a starch and laudanum enema, and washing of the stomach (in selected cases) are useful.

In some cases it will be necessary to temporarily stop by the mouth and to rely on rectal alimentation. (See Enemata.)

Shock and Collapse.—Below is given a tabulated arrangement for the application of remedial measures to overcome shock and collapse.

Elevate the feet and lower the head.

Apply warmth by means of blankets and hot water bags.

Give diffusive stimulants, as aromatic spirits of ammonia, spirits of ether, whiskey or brandy.

Give stimulants by hypodermic, as strychnin, atropin, nitroglycerin, digitalin, and suprarenal solution.

Amyl nitrite by inhalation is very useful in some cases.

Saline solution subcutaneously or by rectum.

Rectal injections of a cup of strong, black coffee are good.

CHAPTER VI.

DETECTION OF COMPLICATIONS.

Complications during the course of the infections are rather the rule than the exception. Their early detection is very important and a clear understanding of the signs of the onset of important and serious complications is necessary, as they will most likely make their appearance during the absence of the physician.

Typhoid Fever.—*Intestinal hemorrhage* occurs in about five per cent of all cases, and is a serious complication. It occurs usually during the third week of the disease, the time when the sloughs of the ulcers are separating and the vessels are easily eroded. The onset is insidious, and without warning the patient passes into a very grave condition.

The general signs of collapse appear, namely, rapid fall of temperature, even to subnormal; paleness of the mucous and cutaneous surfaces; rapid, small, and feeble pulse; sighing respirations; and if the patient be conscious, he may greatly demand "more air." Blood is passed by the bowel, although in some fatal cases the blood does not make its appearance.

Perforation of the bowels is much more serious than the former complication, and occurs in six per cent of cases (Fitz).

Excessive tympanites predispose the advent of this complication. It usually begins with sudden, sharp, stabbing pain in the abdomen followed by signs of collapse. There is rigidity of the abdominal walls, vomiting, abdominal tenderness and distention, a pinched expression, and obliteration of the liver dulness.

Thrombosis.—Enlargement and edema of the limb, pain and tenderness at the point of obstruction.

Gangrene.—The part becomes numb and cold. There may be very great pain. The limb later becomes discolored and tingles.

Other complications are excessive diarrhea, great delirium, coma, otitis media, nephritis, pneumonia, neuritis, cholecystitis, septicemia, arthritis, and bone lesions.

Scarlet Fever.—*Nephritis* is a very serious complication of scarlet fever. It occurs more or less frequently, but in many cases it may be avoided by judicious care.

The signs of its onset are edema and swelling of the lower eyelids; and as the disease progresses the edema becomes more generally distributed over the body. Pain in the small of the back is a frequent complaint; also cramps in the calves of the legs. Headache, gastric disorders, vomiting, and scanty, albuminous, and often bloody urine.

Arthritis occurs to a greater or less extent, announcing itself with swelling and pain in the joints.

Endocarditis is a serious and not infrequent complication of this disease. The signs are rapid and irregular action of the heart; shortness of breath and la-

bored breathing on slight exertion; cyanosis, and swelling of the feet. Cough is more or less annoying.

Otitis Media.—Pain in the affected ear, deafness, ringing and fullness of the ear, and discharge.

Rheumatism and chorea are frequent sequels.

Other complications are pericarditis, pneumonia, pleurisy, and adenitis.

Measles.—*Bronchopneumonia* is not an infrequent complication of measles. In the young it may begin very abruptly with a convulsion, or more gradually with an aggravation of the cough, rise of temperature, rapid pulse, and hurried respiration.

Otitis Media. (See Scarlet Fever.)

Tuberculosis very frequently follows an attack of measles.

Other complications are cancrum oris, laryngitis, and intestinal disturbances.

Mumps.—*Meningitis*. Intense headache, restlessness, vomiting, delirium, and retracted head.

Nephritis. (See Scarlet Fever.)

Other complications are delirium, high fever, arthritis, endocarditis (see Scarlet Fever), facial paralysis, and hemiplegia.

Whooping-cough.—*Pneumonia*. (See Measles.)

Nephritis. (See Scarlet Fever.)

Hemorrhages into the skin, conjunctivæ, and from the nose or lungs may occur.

Other complications are emphysema of the lungs, convulsions, and tuberculosis.

Influenza.—The more important complications of influenza are pneumonia, pleurisy, meningitis, all forms

of neuritis, irregularities of heart action, as bradycardia, tachycardia, etc., angina pectoris, and nephritis.

The nervous sequelæ of influenza are of frequent occurrence and of great importance. There may be great depression of spirits, melancholia, and suicidal tendencies.

Cerebrospinal Meningitis.—*Pneumonia* is not uncommon and may be caused by the germ of cerebrospinal meningitis or other bacteria.

Arthritis is frequent. The joints become swollen, red and tender, and are painful.

Paralysis of certain parts of the body is seen.

Persistent headache is not infrequent and is very obstinate and annoying.

Parotitis, pericarditis, and pleurisy occur.

Pneumonia.—*Pleurisy* occurs in every case of peripheral pneumonia. The respirations are superficial and coughing is short and suppressed. There is a sharp, stabbing pain on taking a long, deep breath.

Edema of the lungs is a very grave complication. There is great dyspnea and cyanosis, restlessness and cough. The expectoration is thin, bloody, and frothy.

Pericarditis is accompanied by restlessness, increased dyspnea, irregularity of heart action, feeble pulse, and the physical signs.

Meningitis, myocarditis, abscess and gangrene of the lung, delayed resolution, empyema, and neuritis occur.

Diphtheria.—Paralysis, especially of the pharyngeal muscles, causing a regurgitation through the nose of food and drink taken. Coughing and strangulation from the invasion of food into the larynx.

Endocarditis. Rapid and feeble pulse, shortness of breath, cold extremities, disturbed rhythm of the heart and edema of the feet.

Other complications are pneumonia, pericarditis, and nephritis.

Erysipelas.—Pneumonia, endocarditis, delirium and coma, septicemia, nephritis, and abscesses.

Chronic eczema and protracted edema of the parts are frequent sequelæ.

Acute Articular Rheumatism.—*Endocarditis* is a frequent complication of this disease. The general condition is worse, the fever is irregular, chills and sweats are common; the heart action may be irregular. Pericarditis and myocarditis occur independently or in connection with endocarditis.

Hyperpyrexia is common, the temperature rising to 107° or 108° in some instances.

Pneumonia, pleurisy, purpura, chorea, delirium, coma, and convulsions.

Smallpox.—Among the complications are laryngitis, bronchopneumonia, albuminuria, myocarditis, otitis media, and iritis.

PART II.

SPECIAL DISEASES.

CHAPTER VII.

TYPHOID FEVER.

Synonyms.—Enteric Fever, Abdominal Typhus, Autumnal or Fall Fever.

Etiology.—The causes of typhoid fever are divided into two classes—predisposing and exciting.

The onset of an acute infectious disease depends on two factors, namely, the resistance of the individual and the virulence of the bacteria and their products. If the resistance of the person be lowered by exposure to cold and damp, to poor food, etc., then the specific bacteria, if they gain entrance to the body or are present in the body, can easily propagate because the resistance or vitality of the person is not great enough to stand the attack of the micro-organisms; consequently disease ensues. On the other hand, if the resistance of the individual be high, that person may even withstand the attack of very virulent germs.

If no germs of a certain disease are present or if they do not gain entrance to the individual, no matter how low his resistance may be he will not contract that disease.

The onset and severity of the course of an acute infectious disease depend on the degree of resistance of the person and the virulence of the infective micro-organisms.

The *predisposing causes* of typhoid fever are Fall season and adult life,—typhoid fever occurs but rarely in the very young or aged. Males and females are about equally susceptible.

The *exciting cause* is the bacillus of Eberth and Koch, or the *Bacillus Typhosus*. This bacterium has great powers of resistance. The bacillus retains its vitality for some time even if heated to 140° F. (dry heat), but will not withstand the same amount of moist heat. It lives even in ice.

The bacilli gain entrance to the body in many ways, but the principal means of ingress are by food and drink. Drinking water probably forms the most frequent mode of entrance. The small creeks and streams leading into the water supply of cities are a source of infection. These small streams derive their virulence from contamination with the excreta of infected persons. The excretions, even if thrown on the ground or buried some distance from the stream, are dangerous and may contaminate the water by percolating through the ground or being washed in by heavy rains or by the freshets in the Spring.

Ice taken from ponds or places contaminated with the bacilli is dangerous. Food infected by polluted hands, by exposure to impure air, or by infectious material carried by, is a source of the disease.

Vegetables and fruits handled by unclean hands or washed with contaminated water are another source.

Milk derives its infective character from polluted hands, or from infected water used either to adulterate the milk or to clean the pans and cans into which the milk is placed. The germs may also drop in from the air which has been contaminated by the secretions of man or animal.

Oysters are said to be a carrier of the infection. They derive their virulence from sewerage which is deposited into the water near the oyster beds. Clothing and bedding become contaminated by drying dejecta.

From what has been said of the cause of typhoid fever it will be seen that much can be done to prevent this disease. Only such water as is perfectly pure should be used for potable purposes. If there be any doubt, the water should be boiled well and cooled by placing ice around the receptacle holding the water and not in the water. To prevent the spread of the disease everything which comes in contact with the patient should be thoroughly disinfected after its use.

The excretions from the bowels and the urine should be collected in vessels containing some disinfectant, as carbolic acid (1 to 20) or bichlorid of mercury (1 to 1000). Do not use the bichlorid of mercury in metallic dishes. Before throwing the excretions away they should be mixed well with chlorinated lime or a strong solution of copper sulphate, and allowed to stand for a short time.

Bed clothing should be soaked in bichlorid of mercury solution or carbolic acid solution before washing. Gauze or handkerchiefs used to collect the nasal and pharyngeal secretions should be burned. A separate set of dishes should be used for the patient.

Wash the perineum and surrounding skin with some antiseptic solution after each bowel movement.

Clinical Symptoms.—The disease is gradual in its onset. The prodromal symptoms are lassitude, malaise, loss of appetite, headache, especially of the frontal type, dizziness, insomnia, slight cough, pain in the nape of the neck, catarrhal conditions of the nose and throat, nose bleed, vague pains, and often slight diarrhea.

Temperature.—The fever rises gradually with a step-like curve with daily remissions of one-half to two de-

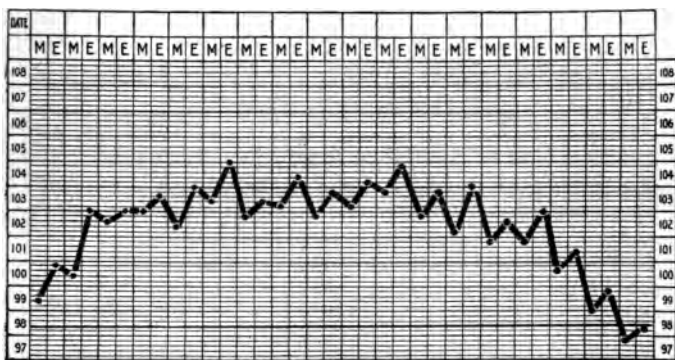


FIG. 10.—Temperature chart of typhoid fever.

grees, and reaches its height usually in seven to fourteen days. After reaching the fastigium the temperature remains there with but slight diurnal remissions for a period of about one week when it begins to decline with marked daily remissions. The temperature generally reaches the normal at the end of the third week or the beginning of the fourth week.

A temperature of 103.5° - 104.5° F. is the average in the second week of typhoid fever. If the fever persist

at 105° F. for any length of time, it is serious. A continued high temperature may be due to some complication as otitis media, pneumonia, etc. A sudden fall in temperature may be due to intestinal hemorrhage or perforation of the bowels. In the decline of the fever a sudden rise may be due to the onset of some complication, to constipation, an error in diet, or mental emotion.

Spleen.—The spleen as a rule is enlarged. The enlargement is generally perceptible at the end of the first week and disappears in the second or third week. A persistently enlarged spleen is said to be indicative of a relapse.

Countenance.—The face is at first flushed and the eyes bright; later the patient becomes listless and the expression dull.

Eruption.—This occurs at the end of the first week. It appears in crops lasting from one to four days. Its presence is especially noticeable on the front of the abdomen and chest as a rose red papular eruption, which disappears on pressure.

Tongue.—The tongue at first is only slightly coated and is moist. As the disease progresses there is a tendency for the tongue to become dry, and in severe cases a dry tongue with numerous deep cracks is not an uncommon occurrence. The tongue is protruded very slowly, due to the apathetic condition.

Stools.—The bowel movements in over fifty per cent of cases are of a yellow ochre color and are called *pea soup* stools. The odor is very foul and more or less characteristic.

Tympanites or distention of the abdomen occurs to

some extent in nearly all cases of this disease. It may reach an alarming degree and interfere with the action of the heart and lungs.

Respiratory Tract.—Bronchitis of varying degrees is a very frequent accompaniment of typhoid fever. Pneumonia may occur in the course of the disease or as a complication.

Circulatory System.—The pulse during the first week varies from 75 to 85 and is in proportion to the rise of temperature. Later in the disease the rise of temperature is greater than the advance in the pulse rate. A pulse rate of 120 in the second week of typhoid fever, if not due to a complication, is said to be a signal of danger. The pulse is often dicrotic after the first stage of the disease. Pericarditis and endocarditis are rare complications of typhoid fever.

Thrombosis of the vessels, especially those of the thigh, is not uncommon. Gangrene of the extremity may follow.

Digestive System.—Tongue. (See above).

Diarrhea occurs in fifty per cent of cases, and if a purge be given, excessive catharsis may follow.

Vomiting is not common, but does occur in the third week, due to an error in diet, perforation of the bowels, or local peritonitis.

Sordes of teeth and lips is an accumulation of food, micro-organisms and epithelia.

Hemorrhage or perforation of the bowels may occur. For a description of these see the section on Detection of Complications.

Musculature.—The muscles diminish in size and be-

come flabby. Emaciation is rapid in cases associated with diarrhea.

The *urine* is diminished in amount, is highly colored, specific gravity is raised, urea is diminished, and albumen may be present in small quantities. In some cases the urine is greatly increased in amount and of a light color. The Ehrlich diazo reaction may be present, a description of which may be found in more exhaustive works.

Nervous System.—Delirium occurs in a large percentage of cases, and may be of the active or noisy type, or the low muttering form. The latter is more common. It occurs in the second or third week. The patient becomes stupid, mutters to himself, may pick at the bed clothes (carphologia). A twitching of the wrists, etc., is often present (subsultus tendium). The patient may lie with the eyes widely open and stare in one direction for some time (coma vigil).

Convulsions may occur in the young.

Other symptoms which may occur are deafness, bed sores, sweats, boils, jaundice, laryngitis, hypostatic congestion of the lungs, neuritis, nephritis, bone lesions and arthritis.

Diagnosis.—This can usually be made from the several days of malaise, frontal headache, slight cough, loss of appetite, nose bleed, rose rash, and enlarged spleen, together with the temperature characteristics.

Typhoid fever may be confused with acute miliary tuberculosis, gastro-intestinal disorders, auto-intoxication, cerebrospinal meningitis, pneumonia, remittent fever, secondary syphilis, bronchitis in children, ulcerative endocarditis, influenza, trichinosis, appendicitis,

septic processes, typhus fever, articular rheumatism, and abscess of the liver.

For the Widal reaction see section on Bacteria in the Addenda.

Prognosis.—The prognosis depends greatly on the treatment. The institution of baths in the treatment of typhoid fever has greatly reduced the rate of mortality. A more or less persistent temperature of 105° in the first week is grave. A pulse of 120 or over is serious.

Diarrhea does not seem to have any effect on the prognosis unless it be exhausting.

Marked tympanites may cause pulmonary complications and may portend perforation of the bowels. Hemorrhage is weakening. Perforation is very serious. Severe nervous symptoms are serious.

Care and Management.—Prophylactic measures are of utmost importance in combatting the spread of typhoid fever. The nurse being in constant attendance will play the chief role in preventing the propagation of the disease to other members of the patient's family or to the individuals of the community.

The water supply, as has already been indicated, is the chief source of danger. All water used by the patient and the family should be of a known purity. If it be impossible to get an absolutely pure spring water, then the regular drinking water may be used, but it must first be made danger-free. This can be very easily accomplished by boiling. The water should be boiled vigorously for fifteen minutes and then allowed to cool.

Do not place ice in the water after it has been boiled,

for in doing so the water is rendered liable to infection. The proper way of cooling the water is to place the pitcher or receptacle filled with water into a larger dish or pan, and then surround the pitcher with cracked ice.. In this way you prepare iced water and not ice-water.

Milk is another source of danger and unless known to be absolutely free from infection should be rendered so. Milk may be either sterilized or pasteurized.

To *sterilize milk* it must be kept at the boiling point (212° F. or 100° C.) for fifteen or twenty minutes. Sterilization of milk renders it less digestible, precipitates the albumin and partially destroys the fat emulsion.

Pasteurization is to be preferred if the milk is to be used within twenty-four hours. This is done by raising the milk to a temperature of 155° F. or 68° C. for thirty or thirty-five minutes and then rapidly reducing the temperature to 50° F. or 10° C. Place in the refrigerator, ready for use. Pasteurization destroys the germs but does not produce the changes in milk that sterilization at the boiling point does.

We have considered the methods of preventing the spread of typhoid fever from outside sources; now let us consider the dangers of infection from the patient himself.

All secretions and excretions of a typhoid patient may be a source of infection, some to a greater degree than others.

First, we have the *secretions from the nose and throat*. These are usually collected on handkerchiefs. It is better to use for this purpose pieces of old muslin

or linen. The cloths after being used by the patient should be burned and not washed. Expectoration should be expelled into small pieces of tissue paper and immediately destroyed by fire.

Clothing.—The undershirt and gowns which are contaminated by perspiration and possibly by urine, should be thoroughly soaked in ten per cent solution of carbolic acid before they are washed and boiled.

The *urine and feces* are a most dangerous source of infection. The urinals and bedpans should contain some antiseptic, as ten per cent carbolic acid solution, solution of copper sulphate, chlorinated lime; if the vessels are not metallic, a one to five hundred solution of the bichlorid of mercury should be used. The antiseptic should be placed in the vessel *before* and not after using. Thoroughly mix the excretive matter with the antiseptic and allow it to stand for a while before emptying it out.

Diet.—What should constitute the diet during the course of typhoid fever is a much debated question. Although many diverse statements have been made on this subject, nevertheless according to the majority of physicians milk forms the basis of diet.

At least four ounces of milk should be given every two hours. If whole milk does not agree with the patient, it should be diluted with plain sterile water, limewater, or Vichy. Water should be given freely, but it cannot take the place of milk.

Lemonade, weak tea, and coffee are allowable. Beef tea, beef broth, some form of predigested beef, gelatin, egg-albumin water, and barley water may be given,

depending on the physician's orders. For the preparation of these articles of diet see Chapter III.

No solid food is to be given until the temperature has been normal for at least ten days.

The *medicinal treatment* of uncomplicated cases of typhoid fever amounts to almost nothing. Recovery depends mainly on general measures and good nursing.

Fever.—The reduction of temperature by means of drugs in typhoid fever is almost obsolete. The physicians of to-day depend nearly entirely on hydropathic measures. A nurse to be thoroughly proficient must know not only how to apply the different means of reducing fever without the aid of drugs, but must also know their relative value and indications.

When the temperature is moderate (103° F.) cold baths need not be given. The regular daily cleansing bath, together with proper ventilation, light bed clothing, and cooling drinks are all that are necessary.

When the fever rises above 103° F. more vigorous means are demanded. Cold sponges, alcohol rubs, cold packs, and cold tub baths are the more common methods. For details of these see Chapter IV.

The systematic use of baths has greatly reduced the mortality in typhoid fever. Applications of cold not only reduce the fever but accomplish equally if not more important other results, as quieting delirium, overcoming insomnia, steadying the pulse and heart, and improving respiration.

It was said at one time that baths were contra-indicated in hemorrhage and perforation of the bowels. It has been established that hemorrhages do not contra-indicate the giving of cold baths.

Plenty of water given internally also tends to lower the temperature by inducing sweating, thus losing heat by evaporation and through abundant hot urine.

There is one important condition which necessitates abstention from giving baths, and that is a weak heart. When cold is first applied to the body the surface capillaries are generally contracted, the arterial tone is raised, and the blood accumulates in the deep organs. This places a sudden and extra labor on the heart and may cause dilatation and sudden collapse.

The use of external cold in the form of sponges, packs, etc., as an antipyretic measure is usually instituted when the temperature reaches 103° F. It is important that the temperature be not reduced lower than 100.5° F. because after the completion of the bath the temperature usually falls a degree or more. If the temperature be kept above the normal, there is no danger, but great care must be taken because when the temperature is reduced below 100° F. it at times falls very rapidly and collapse may follow.

In applying cold by any method surface reaction is of prime importance. In order to obtain this, constant and somewhat vigorous friction and rubbing are necessary. During the procedure the patient is not to be allowed, under any circumstances, to exert himself. He is to be absolutely passive, as conservation of heart energy is a most important object. It is very seldom necessary to give more than six baths in a day. The patient is exhausted when the baths are too frequently given and they become a source of harm rather than of benefit. The writer left word with the nurse on one of his typhoid cases that she should give the baths

at such times as she thought necessary. The next morning the patient was in a more or less exhausted condition. The nurse, on being asked how many baths were given since the last visit, which was the day before, replied eighteen. This accounted for the great weakness of the patient.

Bed Sores.—These common occurrences are first to be prevented from forming; if this be impossible, then measures must be adopted to induce rapid healing.

To prevent them two objects are to be accomplished—removal of pressure against the parts, and hardening of the skin. The first is brought about by frequent changes in the position of the patient or by interposing some cushion between the parts pressed upon and the bed. For this purpose the rubber pneumatic ring or large pads of cotton may be used.

To harden the skin, bathe the parts with alcohol or paint them with a mixture of aloes and glycerin. (Take one ounce of the tincture of aloes and heat it until it is evaporated to one-half ounce. While it is evaporating add gradually six ounces of glycerin.) A most efficient means is to rub the parts with a fresh slice of lemon. Applications of salt and whiskey are good. (Salt, one dram; whiskey, eight ounces.)

When the sore is formed the above measures are useless. The sore must be kept very clean, preferably by syringing with peroxid of hydrogen, and then rinsing with sterile water. Some ointment, as twenty-five per cent ichthyol ointment, should then be applied.

The *mouth should* be kept scrupulously clean. A very good mouth wash is prepared as follows: Boric acid, one dram; juice of one lemon; glycerin, one

ounce; and water to make four ounces. A one to one thousand solution of potassium permanganate makes an excellent wash.

Nausea and vomiting, although rare in typhoid fever, may occur. A mustard plaster placed over the pit of the stomach or an ice-bag on the epigastrium are very useful. Limewater added to the milk will be successful in many cases. A measure which is easily applied and often works well is the inhalation of vinegar fumes.

Diarrhea is very common. When the bowel movements number more than six in twenty-four hours, active measures must be taken to stop the diarrhea. Enemata of starch paste and laudanum, together with a mustard paste applied to the epigastrium, are very useful. Meat juices and broths should be discontinued if they are being given, as they often cause the diarrhea. The diet should be reconsidered; probably the patient is receiving too much milk or milk not sufficiently diluted.

Tympanites is a common and at times a very troublesome symptom. It is due to fermentation in the bowels, to paresis of the muscular coat of the intestines, or to a combination of both. If due to fermentation, intestinal antiseptics, such as salol, thymol, sulphocarbolates, etc., and evacuation of the fermented material by means of laxatives or enemata are indicated. If due to sluggishness or paresis of the bowels, an intestinal tonic or stimulant, as turpentine, is indicated. Turpentine is the best drug we have for relieving the tympanites. It may be used in three ways: internally,

about which the attending physician will give instructions; by rectum; locally to the abdomen as stupes.

Asafetida as an enema is also very useful in expelling gas. See Chapter XXVII for instruction in preparing enemata and stupes.

Constipation.—The bowels should move at least once a day. After the first week it is advisable not to use cathartics but to resort to enemata. Enemata of soap suds, glycerin and water, cotton-seed oil, or the purgative enema may be used. See Chapter on Enemata.

Epistaxis, if it persist or be diffuse, should be treated. Douching the nose with plain hot water, or hot water and vinegar are useful. Spraying the nose with a one to one thousand solution of adrenalin chlorid is useful.

Delirium is best combatted by cool sponges and baths. Opium in the form of Dover's powder is beneficial if a sedative be necessary.

Hemorrhage and Perforation. See Chapters V and VI, Part I.

Care in Convalescence.—During this period care as great as, if not greater than, that during the general course of the disease is necessary. As convalescence advances the visits of the physician become less and less, the responsibilities of the nurse become greater and greater. It is at this time that the patient regains that which he had lost during the run of the disease, as blood, fat, muscular tissue, nervous and mental energy.

The dangers of convalescence are many. The patient acquires a ravenous appetite and demands a greater amount of food and even makes threats as to what he will do if an increased amount of diet be not

oncoming. Great vigilance on the part of the nurse is necessary.

Solid food should not be given until the temperature has been normal for ten days; in the meantime the diet can be varied with eggs in different forms, cereals, jellies, gruels, toasts, etc. Perforation of the bowels has occurred late in convalescence due to the eating of a meat chop.

A rise of temperature during convalescence may be due to a true relapse, which as a rule pursues a shorter and milder course than the general attack; or it may simply be a recrudescence due to constipation, an error in diet, or to mental excitement. A visit from an unwelcome person may send the fever very high.

The patient should at first sit up in bed for a short time daily, then should sit up in bed to eat his meals and later to read or to receive visitors. As he gains strength he may sit in a chair for a short time, but should not receive visitors during the first few *seances*. Walking about the room, first aided and later unaided, should be gradually undertaken.

CHAPTER VIII.

SMALLPOX.

Definition.—An acute infectious fever characterized by an eruption, successively, of papules, vesicles, pustules, and crusts.

Etiology.—The exciting cause of variola is unknown, but it is probably a micro-organism of some type. All ages are liable to the disease. Negroes and dark-skinned people are especially susceptible.

Smallpox is the most contagious of all diseases. It spreads widely, and as a rule attacks all exposed persons unless protected by vaccination, previous attack, or by natural immunity.

The contagion exists in the breath, secretions, and in the dry scales. The disease may be transmitted from dead bodies.

Symptoms.—Prodromal symptoms are not common. The disease usually begins suddenly and with severe symptoms. Three or four days of general malaise may precede the invasion.

The symptoms are severe chill, intense headache, excruciating pains in the back and limbs, vomiting, fever, loss of appetite, and at times, convulsions.

In many cases there is an *initial rash* which may resemble the rash of measles or scarlet fever.

The *fever* begins abruptly high and gradually lowers until the fourth day or such time as the eruption makes its appearance, when the temperature is normal or nearly so. This is a period of great importance as the patient who formerly had severe pains, high fever, and was generally ill is now free from fever and pain, and may consider himself well and thus expose others to the disease. This period lasts for only a few days, until the eruption assumes the pustular type when the temperature goes up to 104° to 105° F. and the patient becomes desperately ill.

The *eruption* begins from three to five days after the invasion. The first manifestation consists of *papules* especially on the forehead, neck, and wrists. The papules will roll under the finger as though they were small shot in the skin. This is very characteristic. In two or three days the papules are transformed into *vesicles*. These contain clear serum and are multi-locular; that is, they are composed of several pockets and if pressed with the finger the serum will only partially escape as some of the pockets are still intact. These vesicles become *umbilicated*, as though the top were being drawn in by a string, a small depression being formed on the summit of the vesicle. In two more days or on about the eighth day, the vesicles become filled with cloudy material of a purulent character. The eruption has then reached the *pustule* stage. With the formation of the pustules the temperature becomes high, 105° F. The pustules begin to dry in a few days and the *crusts* are formed.

During the course of the disease the pulse becomes

rapid and feeble and delirium of a severe type may develop; prostration is pronounced.

Varieties.—*Confluent* smallpox is very severe. This type is characterized by very grave symptoms, and an eruption similar to that described above; but the papules, etc., are very close and thickly set, and accompanied by great swelling of the parts. Superficial abscesses are common. The prognosis is grave.

The *hemorrhagic* type is the most severe form. Hemorrhages occur in the skin around the vesicles and into the pustules. Death, as a rule, follows speedily.

Varioloid is a form of variola modified by vaccination. The symptoms are mild. The eruption passes rapidly through the different stages. There is no secondary fever.

Complications are laryngitis, edema of the glottis, bronchopneumonia, gangrene of the skin, abscesses, and pock marks.

Prognosis.—In the unvaccinated the mortality varies from twenty-five to fifty-five per cent, and in the vaccinated from five-tenths to two per cent.

Diagnosis from Chicken-Pox.—The invasion is not as severe in chicken-pox. The eruption of smallpox passes through successive stages, but is, during the vesicular stage, entirely composed of vesicles and there are no papules nor pustules. The papules in chicken-pox do not have the *shotty* feel. The vesicles are not umbilicated or multilocular. In chicken-pox the eruption comes in crops, and at the same time papules, vesicles, and crusts may be discovered. The formation of pustules is not common in chicken-pox.

Care and Management. — The care and management of a case of smallpox does not differ much from that of any other contagious disease. A most important part of the care is the prophylaxis, which consists chiefly in vaccination.

Before the discovery of vaccination by Jenner, smallpox was a most horrible destructive agent to human life. It is estimated that in Great Britain alone over 30,000 deaths were due to this disease every year.

Vaccination produces in human beings an immunity toward smallpox, which though it is not always absolute, is very highly protective. The disease itself does not entirely protect the patient from future attacks. There are many cases on record of a second attack of the disease, and even a seventh recurrence is reported.

There has been much discussion over the protective power of vaccination. Some members of the medical profession have gone so far as to state that vaccination is not only not beneficial, but is harmful. If we could protect persons from attacks of other diseases as absolutely as we protect them from smallpox by means of vaccination there would be but little need of physicians and nurses. According to Dr. Stark, of England, of 6000 persons inoculated with smallpox virus after a previous vaccination, not a single one contracted the disease.

It has been said that vaccination may introduce into the patient various diseases as syphilis, tuberculosis, erysipelas, etc. It is true that a decade ago or more, when humanized vaccines and impure bovine vaccines were used, these diseases may have been some few times transmitted, but today with improved and

pure vaccines this is an impossibility. The only source of danger is the introduction of pathogenic microorganisms by means of the instruments, dressings or hands of the attendants; but this is a possibility in the case of any wound and can be entirely eliminated by heeding the principles of asepsis and antisepsis.

All children should be vaccinated during the first year of life. Revaccination should be performed at the fourteenth year. Physicians and nurses should be vaccinated whenever an epidemic of smallpox is impending, regardless of the length of the interval since the previous vaccination.

Method of Vaccination.—The cuticle is removed by means of a few scratches of a sharp, sterile sewing needle. The object is not to draw blood, but simply to produce an oozing of serum. The vaccine is placed on this excoriated area and is slightly "worked in" with the needle.

The most common place for vaccination is at the site of insertion of the deltoid muscle in the upper and anterior part of the arm. In right-handed persons use the left arm. The female sex, especially those of the upper class, prefer to have it on the thigh for obvious reasons.

Signs of Vaccination.—For the first three days nothing is noticed as a rule. On the fourth day there may be slight redness around the site of vaccination and also some itching. A small papule may now be seen. By the seventh day this papule or pimple has become a vesicle or small blister filled with a clear liquid. A red zone forms around this vesicle and may be very extensive. Usually about the tenth or twelfth day

the liquid oozes out of the vesicles and a scab is formed which may adhere to the skin for several weeks. After the scab or crust falls off a reddened depression or pit remains which becomes white in time.

In some individuals there is no discomfort of any kind and they would entirely forget they were vaccinated except for the occasional brushing of the affected arm against some resisting surface. On the other hand, some persons become profoundly ill for a short time, due to the constitutional effects of the vaccine. On the third or fourth day fever may begin and persist for four or five days. The appetite is lost, headache and malaise are common, and children may become restless at night. Often the axillary or inguinal glands enlarge, depending on the site of the vaccination. Suppuration, if it occur, is due to some fault in technic. The arm or thigh where vaccination is to take place should be thoroughly cleansed with soap and water and some antiseptic solution, and finally rinsed with sterile water. The needle and dressing should be perfectly sterile.

Sufficient has been said on the subject of vaccination. We will now consider the general management of a case of smallpox.

Isolation is of utmost importance and will probably be secured by the Health Board of the community.

The patient should be placed in bed in a well-ventilated room. Light is to be restricted as much as possible. The bed clothing should be light.

Fever should be combatted as in other febrile disorders (See Chapter IV).

The *diet* should be liquid and nutritious, consisting principally of milk, broths, gruels, etc. Water should be freely given.

For the intense *pain* in the back and limbs, which is so common in the beginning of the disease, nothing can be done except giving anodynes, or the application of ice or hot-water bags. Plasters and poultices should not be used as they increase the irritation of the skin.

The *pulse* should be carefully watched so that stimulation can be instituted as soon as it may be necessary.

General indications should be met as they arise.

Pitting.—There is one sign which demands special consideration, and that is how to treat the eruption so as to leave the least amount of pitting. A great many methods have been described to prevent the pitting in smallpox. In some instances they do good, whereas in other cases pitting results regardless of the greatest care taken to prevent it.

The room should be darkened. It is advised to permit only red light to strike the patient. This can be accomplished by having red curtains on the windows, red lamp shades and even red wall paper and hangings.

Probably the best method to prevent pitting is to keep the parts constantly moist by covering them with clothes moistened with a dilute solution of carbolic acid or bichlorid of mercury. A very satisfactory way is to anoint the parts with a one to one hundred oily solution of carbolic acid, or carbolated vaseline of the same strength. Touching the base of each ruptured vesicle with a stick of nitrate of silver has been advocated.

Keeping the crusts well soaked with vaselin is of prime importance. Whenever carbolic acid is used as a local application, careful watch of the urine should be kept, in order to detect the signs of poisoning from absorption (See Chapter XXV).

Warm baths should be given to facilitate the separation of the scabs.

CHAPTER IX.

SCARLET FEVER.

Etiology.—The specific cause of scarlet fever is at present unknown, although many investigators have at various times heralded their supposed success of finding the micro-organism.

The disease generally occurs in epidemic form, but does from time to time occur sporadically. The epidemics of scarlet fever are more common in the Fall and Winter.

Scarlet fever is very contagious but not as much so as measles. A great many children escape the disease even when in the midst of a severe epidemic. Probably the most dangerous time for its spread is during the desquamation.

The mortality varies from three to thirty per cent, depending on the severity of the epidemic. The dangers of contagion lie in the secretions from the nose and mouth, in the discharges from the ear, in the urine and feces, in the exhaled air, and in the desquamating skin. The disease can be carried in the clothing, and in this way a third person infected.

Incubation period is from twenty-four hours to fourteen days.

Symptoms.—The onset of scarlet fever as a rule is abrupt. A child who was previously well will sud-

denly *vomit* without cause. This causeless vomiting is a very important diagnostic point. The child, if old enough, may complain of an intense *headache*; the *temperature* suddenly becomes high, and the *pulse* very rapid. *Soreness of the throat* and difficulty in swallowing are common.

The mucous membrane of the mouth and pharynx may be fiery red. These symptoms just enumerated are the signs that usually appear in the first twenty-four hours of the disease.

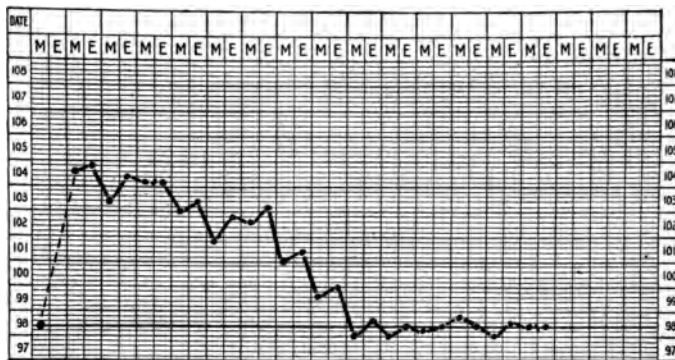


FIG. 11.—Temperature chart of scarlet fever.

During the *second day* the eruption begins. The *rash* consists of a scarlet, punctate eruption, becoming diffuse and stippled. It begins below a line extending from the chin to the lower border of the ear and soon involves the whole body. The area around the nose and mouth usually escapes, leaving here a pale area which is more or less characteristic.

When the eruption is well out, if the hand be firmly pressed on the back or front of the patient's chest, a

pale outline of the hand will remain for some little time, due to a partial paresis of the vessel walls.

During the second day another important sign known as the *strawberry tongue* occurs. The tongue is first evenly coated and then the papillæ become greatly enlarged and protrude, the tongue reddens some and thus the characteristic state of the tongue is attained.

On the *fourth day* the eruption begins to fade in the order of its occurrence.

By the *seventh day* *desquamation* begins. The skin may be shed in scales or in sheets of casts. At times a perfect mold of the hand, like a glove, may be cast off.

The *fever* reaches a great height suddenly, rising to 105° F. or 106° F. When the eruption makes its appearance the temperature begins to fall in a step-like series and generally reaches the normal at the end of a week.

The catarrhal symptoms are slight or entirely absent, thus differing from measles. In young children convulsions often usher in the attack. The skin is dry and burning, the eyes are clear, the urine is scanty and contains some albumen.

Complications and Sequelæ.—The complications of scarlet fever may be numerous and severe.

Pseudomembranous pharyngitis is not uncommon. There forms on the mucous membrane of the pharynx a false membrane, resembling to a degree that found in diphtheria. It is due to the streptococcus and is differentiated only by a bacteriologic examination. The fauces and tonsils are greatly swollen, as are also the

glands of the neck. It is in these cases that middle-ear disease is very liable, being due to infection through the Eustachian tubes.

Malignant, bloody, or black scarlet fever is a most grave condition. In this form there are hemorrhages into the skin. The exuded blood becomes dark, and from this it derives its popular name.

Otitis media is common and serious. It is due, as said above, to infection through the Eustachian tubes. It is a most common cause of deafness in children. The mastoid cells may become involved, and later meningitis and brain abscesses develop.

Cervical Adenitis.—The cervical glands enlarge to a minor degree in a large percentage of cases. In severe cases they may break down and slough, leaving large and indolent ulcers. At times an artery may be eroded when the slough is cast off, which may result in fatal hemorrhage.

Endocarditis is a not uncommon complication of scarlet fever. A patient who has struggled with difficulty to overcome the ravishes of a prolonged and severe attack of the disease, may live only to be troubled through the remainder of life with a much weakened heart.

Nephritis, although a complication, is really a sequelæ and comes on after the general course of the disease. A child who is well advanced in convalescence may be exposed to drafts of cold air and develop nephritis.

It is an old and very proper saying: "In scarlet fever look out for the kidneys around the twenty-first day."

Nephritis of a very severe type may follow a very mild attack of scarlet fever.

The urine, which hitherto has been of a fair amount and contained only traces of albumen, now becomes very scanty, of a very dark color; and is loaded with albumen. It may be *smoky* or like *beef brine*, due to the presence of blood. The face and lower eyelids may become puffy and later a general edema may follow. There are gastric disturbances, and vomiting is common. Headache and pains in the back may be present. The disease may only be mild or may progress and signs of uremia develop.

The number of cases of nephritis following scarlet fever may be greatly lessened by careful nursing. Do not allow the child to leave its bed until directed by the attending physician. The child may have had a most mild attack and the parents may think it unnecessary to keep the child in bed, or the child may be restless and desirous of getting up in a chair, but *be careful*, for it is in these cases that the most malignant form of kidney disease may occur. Be careful about exposing the child to drafts.

Other important complications which may occur are pleurisy, pneumonia, chorea, rheumatism, and pericarditis.

Before discussing the treatment and care of the patient I wish to call attention again to the seven cardinal signs. During the first day we have: Sudden causeless vomiting, severe headache, sore throat, high fever, convulsions in the very young.

Second day: diffuse scarlet punctate rash, strawberry tongue.

Care and Management.—How often do we hear the expressions, “I have had a discharge from the ear ever since my illness with scarlet fever;” or “my kidneys have been weak;” or “I am unable to work or exert myself as other people do because my heart was affected by scarlatina years ago.” These are very common experiences, and are very sad ones because they could have been avoided in many cases if proper care and nursing were instituted during the attack of scarlet fever.

As in all contagious diseases *isolation* is absolutely necessary. The patient and her immediate attendants should be placed in a suite of rooms farthest from the general rooms of the rest of the household. Nobody except the medical attendants should be allowed admission to the sickrooms. All the unnecessary furniture, hangings, and picture frames should be removed from the room. A separate set of eating utensils should be used.

The patient should be placed in bed and covered with light bed clothing. Ventilate the rooms well. Do not be afraid of air. Other children of the family should not be allowed to go to school or mingle with outside children. It is better not to remove them to another house as it is probably too late to be of good. They should not come in contact with attendants of the patient or any clothing from the sickroom. A daily walk in the open air is a necessity. Keep careful watch of them so in case they have become infected, treatment may at once be instituted. Arrangements must be made to keep the patient in bed at least three weeks.

Diet.—As in all febrile disturbances the appetite is

impaired and the digestive functions are below par; therefore, it is necessary to provide food which is easily digested and does not require much work on the part of the digestive organs. The kidneys are very easily disturbed in this disease, so that food which is irritating to the kidneys, or throws extra labor upon them, should be eliminated from the diet. We know that meats, especially the red meats, do cause increased renal effort.

The requirements are that the food should be bland, liquid, or at least very soft and highly nutritious. Milk will meet all these requirements and should form the basis of the diet. It may be diluted with water, limewater, barley water, or a carbonated water.

Water should be freely given. Lemonade is allowable. A very pleasant beverage is prepared by adding a teaspoonful of cream of tartar to a quart of boiling water, the juice of a lemon, and sugar to taste. Serve cool.

A daily tepid or cool bath is of service and is refreshing. Should the temperature range high the bath may be made cooler and repeated several times during the day.

The mouth, nose, and throat should receive daily attention. They may be sprayed, swabbed, or douched with some mild antiseptic as a two per cent solution of boric acid, a one to sixteen solution of hydrogen peroxid, a one to two thousand solution of potassium permanganate, or one of the many alkaline antiseptics prepared by the reputable drug houses of this country.

For *pain* in the throat nothing is more serviceable than the external application to the neck of an ice-bag.

If objections are made to cold, then hot water may be applied. In older children the sucking of small pieces of ice is very agreeable and beneficial.

Headache is best relieved by the application of an ice-bag, or rubbing the head with some evaporating solution, as alcohol or a two per cent solution of menthol in alcohol.

Sleeplessness and delirium are best combatted by cool baths and an ice-bag to the head.

Ear complications are not infrequent and are very serious. If the patient complain of earache, or a slight discharge is seen coming from the external auditory meatus, call the physician's attention to it at once.

For earache nothing is better than the application of heat. This is best accomplished by filling a common rubber fountain bag with water at a temperature of 105° F. Raising the bag just above the level of the ear, allow the warm water very gently to enter the external auditory canal.

When a discharge is present the ear may require douching. This is done in the same way, except with some antiseptic solution instead of water. A one per cent solution of boric acid or a two per cent solution of carbolic acid may be used.

Kidney Complications.—The main question is how to prevent the renal complications. In some instances they cannot be prevented, no matter what is done. If the following suggestions are heeded the danger will be reduced to a minimum:

Keep the patient in bed for a sufficient length of time; at least three weeks.

Prevent the patient from exposure to cold.

Give water freely.

Be careful in regard to diet. Permit no meat, broths or gruels.

When nephritis makes its appearance, the bowels must be kept freely open with saline laxatives. The diet must be entirely milk. Water should be given in abundance. The object is to relieve the kidneys of part of their work. Sweating is to be encouraged by hot packs and baths. Hot normal saline enemata are very useful. Hypodermoclysis of normal saline solution may be given in the more severe cases.

Heart Weakness.—The toxins of scarlet fever seem to have a peculiar affinity for the heart structures, and may result seriously. If the pulse become rapid, irregular, or altered in rhythm, the medical attendant's notice should be called to it. Prevent as much physical exertion on the part of the patient as possible.

When *desquamation* begins the body should be anointed with some oily preparation, as olive oil, lard oil, vaselin, lanolin, or glycerite of starch. This will render desquamation more rapid and will prevent the diffusion of the scales.

Quarantine.—This is a much debated subject. No length of time can be given, but it can generally be said that quarantine must be enforced until desquamation or scaling has completely ceased. If scaling has ended and there is still a discharge from the nose, throat, or ear, danger is still present.

After the patient has recovered it is necessary to prepare the room for occupancy by the household. This is best accomplished by fumigation or disinfection. Foremost of all disinfectants at the present time

is formaldehyd gas. Leave all the patient's and nurse's clothing in the room. Loosen the bed clothing and hang it about the room on chairs. Close all the windows and calk their loose joints and also the crevices about all doors. Open the drawers of all furniture in the room. Stand books on their ends and separate the pages. With a whisk broom immersed in water, or a small sprinkler, dampen slightly the carpets and clothing in the room. Everything is now ready for the disinfection.

Formaldehyd gas is set free in three different ways: By heating wood alcohol; by heating the solid formaldehyd; and by heating formalin, which is a forty per cent solution of formaldehyd. Apparatus for generating the gas may be purchased for a moderate sum, or an ordinary alcohol lamp placed under a tin vessel containing formaldehyd or formalin may be used. Henry V. Walker, of Brooklyn, has devised a very simple and effective method of generating the gas, devoid of all danger.

To six ounces of formalin add two ounces of commercial sulphuric acid, and mix this with one pound of unslaked lime. This amount is sufficient for one thousand cubic feet capacity. If the room be larger than this, use larger quantities of the chemicals. This method has the advantage of cheapness, freedom from fire, and does not require any special apparatus. It is very rapid and efficient.

After placing the mixture in the room to be fumigated close the door tightly and allow the room to remain closed for twenty-four hours; then open all

the windows to free it from odor. The room is now ready for occupancy.

Precautions.—Certain precautions are necessary to prevent the nurse from contracting the disease, especially if she has never had it. The nurse should be out of doors as much as possible when off duty. Keep the sick room thoroughly ventilated; a draft is of great harm to the patient, but ventilation is not only not harmful, but necessary.

The nurse should change her clothing frequently; and also the bed clothing.

Keep the mouth, nose, and throat clean by means of gargle and sprays.

Keep all the exposed parts of the body in as clean a condition as possible.

All secretions and excretions of the patient should be carefully collected and thoroughly disinfected.

A separate set of eating utensils should be used for the patient.

CHAPTER X.

MEASLES.

Measles ranks next to smallpox in degree of contagiousness. When measles once enters a community it affects almost all unprotected children.

Measles is an acute, infectious fever, characterized by coryza at the onset, followed by a peculiar blotchy eruption.

Etiology.—As in the case of scarlet fever the exciting cause is unknown at the present. As said above, measles is intensely contagious, and the contagium is present in the exhaled breath and all excretions. It may be carried in the clothes to a third person.

Its occurrence may be endemic or epidemic. One attack usually protects from subsequent ones, but many recurrences in the same person are known. Unprotected adults are liable to infection.

Symptoms.—The *incubation period* of measles varies from seven to fourteen days. The disease begins in a very characteristic way and differs much from the onset of other contagious diseases. It is ushered in by a *feverish cold*, the eyes are watery, the conjunctivæ are injected, and it is painful for the patient to look at a bright light. The nose “runs” as

in a severe "cold in the head." There is a general malaise, loss of appetite, feverishness, chilly sensations, sneezing, and coughing.

The throat is red and blotchy. On the buccal mucous membrane there appears a very characteristic and pathognomonic sign known as *Koplik's sign*. On the mucous membrane of the mouth, especially opposite the last molar teeth, there are small, bluish-white spots having a red base. These are formed many hours before the appearance of the skin eruption and are a great aid in diagnosis.



FIG. 12.—Temperature chart of measles.

The *fever* for the first three or four days rises gradually to about 102° F. and then as the eruption appears the temperature climbs to its height, where it remains until the eruption is complete. It falls by crisis.

The *eruption*, as a rule, makes its appearance on the fourth day, occurring first on the forehead, neck, behind the ears, and around the nose, and then gradually

spreading over the body. The rash begins with small, red papules, more or less discrete; many of the papules are arranged in crescentic outline, which is very characteristic.

As the disease progresses the eruption takes on a blotchy appearance of a bluish-red hue. The face is swollen and has the appearance of being "boiled." The papules and blotches are slightly elevated. At times there are hemorrhages into the skin, producing what is known as *black measles*.

Desquamation occurs usually at the end of the first week. It is fine and branny. The *cervical glands* are slightly enlarged, the *tongue is coated*, and the *lips* are dry.

Complications.—The complications of measles are more serious than the disease.

Bronchopneumonia is not an uncommon occurrence during measles and is very grave. If during the course of measles the child have a convulsion, a developing pneumonia may be looked for in the majority of cases, as a convulsion often ushers in the pulmonary complication.

Laryngitis is common.

Otitis media is common during convalescence.

Cancrum oris or gangrene of the cheek occurs in not a few cases. It is also known as *noma*.

Sequelæ.—Tuberculosis follows measles very frequently and on this account careful watching and nursing must extend far into convalescence in susceptible cases.

Prognosis.—The mortality of measles, per se, is small but the large death rate in some places is due to the complications, especially those of the lungs.

Care and Management.—A patient ill with measles of slight severity needs but little medication. He should be isolated as soon as the character of the disease is known. The same precaution should be taken with other children in the house as in scarlet fever. It must be remembered that measles is more contagious than is scarlatina.

The room is to be well ventilated and airy, with an even temperature of about 65° F. As the eyes are very sensitive to the glare of light, the room must be darkened or the eyes shielded, and the curtains drawn and the position of the bed corrected.

The *diet* should be liquid, light, and very nutritious, consisting principally of milk. Water may be freely given.

The usual daily bath with tepid water is to be given. If the fever be high or restlessness prominent, a cool sponge will be found beneficial. The nose, throat, and mouth should be cared for as in scarlet fever.

If there be a dry, troublesome cough, it may be greatly relieved by allowing steam to freely escape into the room. It is well to have the steam medicated with turpentine or oil of eucalyptus. Fill an ordinary tea kettle nearly full of water and to it add a dram of either of the above drugs. Boil the mixture and allow the vapors to escape into the room.

Pneumonia is a frequent complication of measles. To avoid it care must be taken that the patient be not exposed to cold or draughts.

Quarantine should last at least three weeks. The bed clothing, gowns, and the room should be disinfected after recovery of the patient, as described under scarlet fever.

CHAPTER XI.

GERMAN MEASLES.

This disease, although hardly ever requiring the care of a trained nurse, is discussed because of the liability of its confusion with measles and scarlet fever.

Synonyms.—Rubella, hybrid scarlet fever, French measles, epidemic roseola, and r  theln.

Etiology.—The exciting cause of rubella is unknown. It is contagious and the epidemics may be widespread and travel rapidly. In small towns it has been known to have entered every household.

It was supposed to be akin to measles and scarlet fever, but a previous attack of either of these diseases will not protect the individual from rubella; neither will an attack of German measles protect from invasion of measles or scarlet fever.

Symptoms.—The course of German measles can readily be divided into four parts, namely, incubation, invasion, eruption, desquamation.

The *incubation period* varies from ten to sixteen days.

The *invasion* is, as a rule, gradual and the symptoms are mild, although the patient may be very ill.

The disease usually begins with malaise, headache, pharyngitis, and rarely with coryza and conjunctival

the back and legs. The cervical glands are usually enlarged. This last sign is the most characteristic symptom of German measles.

The *eruption* usually begins within twenty-four or forty-eight hours after the infection. It makes its appearance first on the face and then spreads rapidly over the whole body. This may be complete in twenty-four hours and is very characteristic. The rash is more pronounced on the flexor surfaces of the limbs. The eruption, which may resemble that of scarlet fever or measles, lasts two or three days and then fades in the order of its appearance.

The *scarlatinal form* is often mistaken for scarlet fever. The rash is of a bright red, but is very uniform and smooth, and *stippling*, so prominent in scarlet fever, is absent. The sore throat is of a mild type, as is also the fever.

The *measly form* is often mistaken for measles. The rash is of a bright red color but the regular crescentic arrangement, so characteristic of measles, is lacking.

Desquamation is slight and branny.

Diagnosis.—The diagnosis of rubella is made from its mild symptoms, slight fever, the enlargement of the cervical glands, and the rapid appearance and disappearance of the rash.

Prognosis is good. At times, however, the disease takes a very severe course.

Complications of rubella are few. The enlarged glands may soften and become abscesses. Pneumonia, nephritis, and intestinal disorders may occur.

Management.—Rest in bed and quietness for at least one week are essential. Confinement to the bed

may be difficult to enforce on account of the mildness of the disease.

Cold or hot applications, preferably the former, to the neck are useful. The patient should be quarantined for at least three weeks.

CHAPTER XII.

MUMPS.

Synonyms.—Epidemic parotiditis, parotiditis.

Definition.—An acute infectious disease, characterized by inflammation of one of the salivary glands, especially the parotid gland.

Etiology.—The exciting cause of the disease is unknown, although certain French authorities claim that a coccus is the specific cause.

The disease is contagious. Children under one year are rarely attacked.

The *incubation period* is from fifteen to twenty-one days.

Symptoms.—The disease begins with several days of malaise, headache, feverishness, chilliness, sweating, ringing in the ears, neuralgic pains, loss of appetite, and there may be bleeding from the nose. The swelling begins below and in front of the ear, and gradually extends upward and backward, so that the tumor becomes shaped like a stocking. This tumor is tender and accompanied by more or less pain. There is a very tender area behind the angle of the jaw near the tip of the mastoid process of the temporal bone.

It is difficult and painful to open the mouth widely. The saliva is usually scant and the mouth dry. An

acid introduced into the mouth causes great pain and discomfort, due to its stimulating the flow of the saliva. Swallowing is painful. The disease often affects both sides and may involve the testicles or ovaries.

The *course* of the disease is from three to six days, but may be extended and complicated.

Complications.—This disease, although generally of a mild character, may be seriously and gravely complicated.

Cerebral disorders, delirium, and coma may occur. Suppuration of the gland, orchitis, mastitis, ovaritis, deafness, pneumonia, endocarditis, and pericarditis are among the other complications.

Management.—The patient should be kept in bed during the acute course of the disease. Liquid diet is about all the patient will be able to take. Mouth washes and gargles are useful.

For extreme pain and tenderness hot applications are very good. If the child will permit, there is nothing more soothing than the application of an ice-bag to the swelling. A hot lotion of lead and opium, locally applied, is useful.

For orchitis, support and protection are sufficient.

Tepid or cool sponging if the fever be troublesome.

CHAPTER XIII.

WHOOPING-COUGH.

Synonyms.—Pertussis, chin cough.

Etiology.—The specific cause is unknown. The disease is contagious and occurs in epidemic form. The contagium is conveyed in the sputum and nasal secretions. Children, especially those with nasal disorders, are particularly liable. Unprotected adults may contract the disease.

Symptoms.—The course of whooping-cough may be divided into three stages, each of about two weeks' duration, namely, stage of onset, or the *catarrhal stage*; secondly, the convulsive or *whooping stage*; and lastly the stage of *decline*, or *convalescence*.

The *catarrhal stage* is characterized by symptoms of a severe cold in the head and bronchitis. There is running of the nose, injection of the conjunctivæ, slight fever, malaise, loss of appetite, and a dry cough. The cough tends to become paroxysmal in the latter part of this stage. The fever is moderate, very seldom becoming very high.

Whooping stage is the characteristic part of the disease. The whoop is of respiratory origin. There are first a series of short, jerky expiratory coughs, followed by a long drawn inspiration which produces the peculiar whoop. Several of these paroxysms may

occur successively, followed by the expulsion of a small quantity of viscid mucus. Vomiting may occur during or after a paroxysm.

During the fit the veins of the face become greatly distended, the face congested, the eyeballs protruded and the conjunctivæ injected. The child seems near its end and asphyxia impending, when air rushes into the lungs with a shrill sound and the paroxysm is at an end. From four to fifty of these fits may occur in twenty-four hours.

The Stage of Decline.—The paroxysms grow less in number and severity and gradually cease. The cough still lingers and retains to a less degree its paroxysmal character. Anemia of a certain grade usually develops. Ulcers at or near the frenum of the tongue are a frequent accompaniment and are caused by an irritation of the teeth during the coughing or whooping fit.

Complications.—Bronchopneumonia is very frequent. Pleurisy, emphysema, pulmonary collapse, persistent vomiting, hemorrhages from the nose and lungs, meningeal hemorrhages, convulsions, and intestinal catarrh are among the complications of pertussis.

Sequelæ.—Pulmonary tuberculosis often follows an attack of whooping-cough, and care to prevent it must be exercised.

Care and Management.—Whooping-cough is a disease of some seriousness and is made doubly so by the fact that it is often complicated by bronchopneumonia and makes the patient particularly vulnerable to pulmonary tuberculosis.

The treatment of the disease with medicines is especially unsatisfactory. A great many drugs have been

advocated. Although the nurse has no power to prescribe remedies, nevertheless a partial list of the drugs are appended so as to emphasize the uncertainty of drug treatment.

They are belladonna, antipyrin, acetanilid, phenactin, quinin, bromoform, bromids, chloral, opium, cannabis indica, amyl nitrite, cocain, chloroform, resorcin, lobelia, croton chloral, ichthyol, salicylates, etc., etc.

The patient should be kept in a large, airy, well-ventilated room. Plenty of fresh air is absolutely necessary. The breathing and rebreathing of the same infected air prolongs the course of the disease and increases the number of paroxysms. In summer have all the windows open. In whooping-cough the lungs and the mucous membrane of the respiratory tract are very sensitive to cold, and for this reason great care must be exercised that the patient be not exposed to draughts.

The *diet* is to be liquid and highly nutritious. During the paroxysmal stage vomiting may occur after each fit of whooping. In order to prevent this and to maintain the nourishment of the child it is best to give a very small amount of milk after each paroxysm, instead of larger quantities at longer intervals.

If the disease be seen in the very early stages, it may be abated, shortened, or lessened in severity by spraying the mouth, nose, and pharynx with some germicidal solution. Peroxid of hydrogen gives excellent results when used for this purpose. Prepare a solution of equal parts of glycerin and peroxid of hydrogen and use this, well diluted, as a spray.

If the cough be dry and troublesome, it may be

greatly relieved by saturating the air of the room with steam or by employing a bronchitis tent.

A bronchitis tent may be improvised as follows: If the bed posts do not reach a height of three feet above the patient, then fasten to each corner of the bed a stick,—a broomstick will do,—so that the top of each upright stick is three feet above the patient. Place a sheet over these sticks so as to form a canopy or awning above the child, and so that three sides of the bed are covered, thus forming a tent with a covered top and three sides, one side being open. Under this tent conduct by means of tin pipe or hose steam from a nearby boiling kettle of water.

Belladonna is one of the most frequently used drugs in the treatment of whooping-cough, and probably exerts the greatest benefits. An excellent way of maintaining constantly the action of this drug is by placing a freshly made belladonna plaster on the back of the patient, preferably between the shoulder blades. The plaster may be renewed every five or seven days.

During the very severe paroxysms, a few whiffs of chloroform are very useful. Pour a few drops of chloroform on the palm of the hand and allow the patient to inhale the vapors from your inverted hand as it is held near the patient's nose.

A mustard paste to the front of the chest is useful in excessive and harsh coughing.

Whooping-cough is contagious, therefore isolation of the patient is as necessary as in other communicable diseases.

CHAPTER XIV.

INFLUENZA.

Synonyms.—La grippe, epidemic catarrh, catarrhal fever.

Definition.—An acute, infectious fever, occurring epidemically or pandemically, and characterized by severe general pains, great prostration, and involvement of the mucous membrane of the respiratory or alimentary systems and more or less pronounced nervous phenomena.

Etiology.—The exciting cause is the bacillus of Pfeiffer. At times the disease appears to be contagious; at any rate it is very infectious. The bacillus is found in the secretions of the nose and bronchi.

The disease spreads with great rapidity and affects more people at one time than any other disease.

In large cities it may reappear every two or three years.

Infants are less susceptible than older children and adults, and when they do contract it they have a less severe form and the sequelæ are less frequent.

Symptoms.—The incubation period is from one to four days. The onset is abrupt, beginning with sensation of chilliness or even a severe chill, malaise,

loss of appetite, great prostration, moderate fever, and severe pains in the head, back, and limbs. Herpes is common.

There are four principal forms of influenza: The *respiratory form*, characterized by coryza, sneezing, watery discharges from the nose, injection of the conjunctivæ, hoarseness, cough and raising of thick, purulent masses of sputum. There are also symptoms of severe bronchitis, the pulse becomes rapid and prostration is out of proportion to the fever and other symptoms. Laryngitis of a severe type may occur, accompanied by a metallic cough, hoarseness, or even a loss of voice.

The *alimentary form* is characterized by nausea and vomiting, diarrhea, abdominal pains, rise of temperature, and in some cases jaundice. The symptoms of the respiratory form may also be present.

The *nervous form* is often devoid of any catarrhal symptoms. The pains in the head, back, and limbs are extremely severe; insomnia is very troublesome, the prostration is great, chills are common, and meningitis and hemiplegia may occur.

The *typhoid form* is characterized by a continuous irregular fever. The temperature may become very high, the pulse be very rapid, and delirium and other nervous phenomena are not uncommon. This form simulates typhoid fever to some degree.

Course.—In mild cases the pains are soon relieved; the temperature becomes normal in four or five days and convalescence ensues. In more severe cases the course of the disease is prolonged and the

prostration continues until convalescence is far advanced. The cough may persist for weeks.

Sequelæ.—Weakness, tiredness, and debility are frequent sequelæ. Palpitation of the heart, tachycardia or bradycardia are frequent results. Commonly following influenza are severe nervous complications of a functional type, such as neurasthenia, hypochondria, melancholia, and suicidal tendency.

Influenza often excites into an active form many latent diseases. If there be a lurking area of tuberculosis, it will undoubtedly become active.

The susceptibility for all diseases is increased and the resistance of the individual lessened.

Complications.—Pneumonia of the regular type may occur, or that form known as the *grippe pneumonia*, due to the influenza bacillus; the import is grave. Pleurisy, neuritis, nephritis, meningitis, insanity, cardiac lesions, and phlebitis occur.

Prognosis.—Influenza is slow in convalescing. It is a very grave disease in persons affected with tuberculosis, nephritis chronica, asthma, and cardiac disease. In elderly individuals the prognosis is also grave. In the young it is not serious. In many cases the disease itself is entirely eradicated, but nervous disorders of more or less permanency remain.

Care and Management.—*Isolation* is necessary and should be maintained. The attacks may be light in severity, but every person at all acquainted with medicine has frequently seen this disease transmitted to every member of a household because isolation was neglected.

Rest in bed is imperative. The room should be large

and well ventilated. The *diet* should be liquid while fever persists, after which semiliquid articles may be added to the dietary.

All *excretions*, especially those of the upper respiratory passages, should be collected and destroyed. The cloths used, as handkerchiefs, are to be burned.

If the *temperature* become excessive, then cool or cold sponges and baths should be employed.

For the *headache* nothing is so useful and agreeable as the application of an ice-bag to the head.

Sleeplessness may be overcome by tepid sponges, a hot foot bath or an ice-bag to the head. A hot drink will often induce sleep.

The *nose*, mouth, and throat should be kept clean by means of sprays, douches, gargles of mild antiseptic solutions, as a two per cent solution of boric acid; a one to one thousand potassium permanganate solution, or hydrogen peroxid, one to eight.

For irritating *bronchitis* steam inhalations or the use of a bronchitis tent will be found an excellent means of relief.

For the *severe pains* in the chest and back, the mustard paste is a most excellent agent. Turpentine and lard rubbed over the parts is good. A liniment composed of equal parts of alcohol, soap liniment, and weak ammonia water is quite efficient.

Cardiac depression sometimes occurs very suddenly and immediate action is necessary on the part of the nurse. For this purpose use strychnin, gr. one-thirtieth hypodermically, and aromatic spirits of ammonia either alone or combined with the compound spirits of ether, given in dram doses.

The **convalescence** from influenza is very slow. The patient rallies very gradually from the extreme weakness. The general functions of the body are at a low ebb. After the fever has disappeared the temperature goes toward the other extreme and a subnormal condition is very frequent. The heart in many cases becomes quite slow. This low temperature makes the patient very susceptible to draughts and climatic disturbances. It is very important that the patient does not leave her bed too soon, and when permitted to do so, in the beginning it should be for short periods. A part of the day should be spent in bed until convalescence is well advanced.

Massage is very useful in toning and repairing the wasted muscles.

The diet should now be varied and highly nutritious. Milk and eggs should be frequently taken.

When the patient has become fairly strong, but not until then, a visit to the mountains or seashore, or a short sea trip will be very beneficial.

CHAPTER XV.

EPIDEMIC CEREBROSPINAL MENINGITIS.

Etiology.—The cause of epidemic cerebrospinal meningitis is the diplococcus intracellularis. Young children are very susceptible to the disease. It also breaks out in crowded places as in barracks, prisons, etc. It is not very communicable.

Symptoms.—The onset of the disease as a rule is sudden. A chill as severe as the initial chill of pneumonia may usher in the disease, followed by severe headache, vomiting, convulsions in the very young, pains in the back, loss of appetite, great irritability, somnolence. The temperature rises to 102° F. or thereabouts, the pulse is at first full and strong and may become very slow, the neck becomes stiff, strabismus develops, and photophobia or dread of light is not uncommon. In severe cases there are, in addition, spasms of a tonic or clonic character, opisthotonos, delirium, stupor, coma, and Cheyne-Stokes respiration. Herpes labialis is of common occurrence.

Petechiæ and purpuric spots may develop in the skin, and it is from this that the disease acquired the name of *spotted fever*.

Course.—There are three types of this disease.

A *mild form* in which the symptoms rapidly occur and in three or four days disappear and a rapid convalescence follows.

A *simple acute form*, characterized by a more or less irregular course of six to fifteen days' duration. The symptoms may be severe but complications are slight or absent.

A *fulminating form* which begins abruptly and with very severe symptoms. The purpuric rash is common and death releases the patient in a very short time.

Complications.—Pneumonia is not an uncommon accompaniment of cerebrospinal meningitis. Pleurisy also occurs. Pericarditis, arthritis, parotitis, and peritonitis may develop. Neuritis, paralysis, blindness, deafness follow complications involving nervous structures. Hydrocephalus, otitis media and mastoiditis, chronic headache, and mental feebleness may result.

Prognosis.—The mortality varies from twenty to seventy-five per cent. Cases of the fulminating type seldom recover.

Diagnostic Points.—Suddenness of onset, severe headache, projectile vomiting, bulging fontanelles, stiff neck, and apathy.

Kernig's sign is of diagnostic importance. To elicit this sign, place the patient on his back and flex the thigh on the body; now, if meningitis be present, it will be impossible to extend the leg on the thigh because of the muscular contraction due to the disease.

Lumbar Puncture.—If a long aspirating needle be introduced into the cavity of the spinal column between the third and fourth lumbar vertebræ, which space is on a level with the crests of the ilia, some of the spinal

fluid may be removed. This fluid is clear in cases of tubercular meningitis, but cloudy in epidemic cerebrospinal meningitis. Culture for detection of the germ may also be made from this fluid.

Lumbar puncture is also one method of treatment.

Care and Management.—As far as the treatment of this disease by medicines is concerned, it has been said that the mild cases need none and the malignant one will not react to medication.

The first requisite is *isolation* of the patient. The room should be large, cool, airy, and well darkened.

The *diet* should consist of milk, eggs, broths, gruels, and predigested forms of beef. Water may be freely given.

For the *headache*, which is present in nearly all cases and is generally of a severe type, the application of the ice-bag to the head is the only local measure of any merit. Ice-bags to the head and along the spine serve three purposes: they relieve pain and headache; they prevent excessive fever and lower the nervous phenomena, and they retard the formation of effusions.

If the *temperature* be high, cold sponges or baths may be used as in typhoid fever. Warm baths at a temperature of 104° F. have been recommended to lessen the tendency to spasms and convulsions.

Blistering agents to the nape of the neck early in the attack lessen the formation of meningeal effusions.

Vomiting is best treated by thoroughly emptying the bowels and placing the patient on a diet of peptonized milk exclusively.

Convulsions may be stopped by hot baths, and if very severe, by inhalations of ether or chloroform.

Convalescence is slow as a general rule, but may be hastened by instituting a diet of very nutritious foods; by administering tonics of iron, gentian, arsenic, etc., and by abundance of fresh air and sunshine.

CHAPTER XVI.

LOBAR PNEUMONIA.

Definition.—Lobar pneumonia is an acute infectious fever, characterized by inflammation of the lungs, with symptoms of general toxemia. The lesion is due to a specific bacterium—the pneumococcus.

Synonyms.—Croupous pneumonia, fibrinous pneumonia, pleuropneumonia, pneumonitis, lung fever.

Etiology.—The *exciting cause* is the pneumococcus.

Predisposing causes are the Fall and Winter seasons, exposure to the elements, cold and rain. Elderly and enfeebled persons are very susceptible. The use of alcoholic beverages to excess, lowering the resistance of the individual, pre-existing diseases as diabetes, nephritis, typhoid fever, and injury to the thorax may precipitate an attack.

The germ causing pneumonia is said to have been found in the mouths of sixty per cent of individuals.

Pathology.—The course of the pathologic events are divisible into three stages.

First stage consists of engorgement or congestion of the lung. It lasts from twelve to thirty-six hours. If the patient die in this stage, the lung will be found very red, and when cut the blood drips from it. It crepitates when pressed between the fingers and when placed in water it floats midway.

Second stage or the stage of *red hepatization*. The lung is very solid due to the great amount of fibrinous exudation, and resembles very much the consistency of the liver and is red in color. From these two facts the condition derives its name.

The cut surface of a lung in this stage is granular and somewhat dry. There is no dripping of blood. When placed in water it sinks to the bottom. It does not crepitate on pressure.

Third stage or stage of *gray hepatization*. The exudate of the former stage is now undergoing certain degenerative changes and becomes gray in color and more fluid. When placed in water it floats.

Symptoms.—The onset of lobar pneumonia is usually abrupt. There may be a day or two of malaise, headache, and loss of appetite, but as a rule it begins suddenly with a *chill*. The chill is very severe and pronounced, sometimes lasting from twenty to thirty minutes and so vigorous as to shake the bed if the patient be in bed at the time. The *temperature* rises rapidly and to a high point (104° to 106° F.); there is a sharp *stabbing pain* in the side, especially pronounced on coughing or breathing deeply, and is due to an acute pleurisy.

Cough appears early and is short and suppressed because of the pain it causes. The *sputum* is very characteristic in the first part of the disease. It is scant in amount, very viscid, and of a reddish, rusty color. If the cup in which the patient expectorates be inverted, the sputum, on account of its viscidness, clings to the walls of the cup and does not fall out.

The *respirations* become very rapid and at times irregular.

The *face* is flushed and the flush is said to be greater on the side in which the pulmonary lesion is situated.

Herpes labialis is very common in this disease. The *alæ nasi* dilate on inspiration, and the grunt on expiration is more or less characteristic.

The *tongue* is coated, the mouth dry, nausea and vomiting are not uncommon.

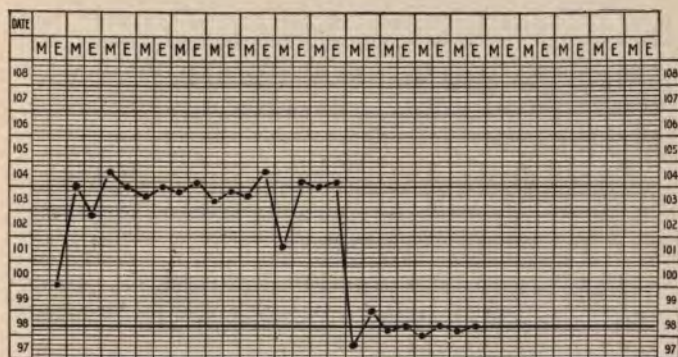


FIG. 13.—Temperature chart of lobar pneumonia.

The *urine* is scant in amount, highly colored, of a high specific gravity, and contains a small amount of albumen.

Fever.—The temperature, as said above, becomes rapidly high; after reaching its fastigium it remains at a common height for three to seven days, when it suddenly falls by *crisis*. Two or three days before the crisis there may be a pronounced fall in the temperature, but it soon reaches its height again. This fall is known as the *pseudocrisis*.

Just before the occurrence of the crisis the patient, who has hitherto been restless, will fall into a quiet sleep—the *precritical sleep*.

The crisis is accompanied by a drenching sweat after which the patient becomes very comfortable.

Nervous Symptoms.—In children and young persons convulsions may usher in the disease. Delirium of an active type may occur, especially in persons of alcohol habit.

Physical Signs.—*First Stage.* Vocal fremitus is increased; there is slight dulness on percussion; decreased respiratory murmur at first; crepitant râles are present and important; vocal resonance is increased; friction crepitus is heard.

Second Stage. Vocal fremitus increased; dulness on percussion prominent; breathing becomes bronchial; no râles; bronchophony present.

Third Stage. Vocal fremitus increased; dulness on percussion less prominent; breathing at first bronchial and later bronchovesicular; râles of the crepitant and subcrepitant types.

Varieties.—*Infantile Pneumonia.* Instead of beginning with a chill this type in many instances is ushered in with a convulsion. Vomiting is of frequent occurrence. The course is not regular.

Pneumonia in the Aged.—The temperature is not as high as in young adults. The pulse is rapid, feeble, and irregular. The temperature usually falls by lysis.

Wandering Pneumonia.—This form moves from place to place. It may start in the lower lobe of one

lung and then migrate to the other lung. If the course be slow and it resolve in one place while it is acute in another, the prognosis is not so bad.

The *typhoid form* is of a nervous type. The tongue is dry, delirium is common, and the usual toxic symptoms seen in typhoid fever are present.

Central Pneumonia.—In this form a patch of centrally located lung is involved. The physical signs are absent at first.

Complications.—Pleurisy is of very frequent occurrence as the dry form. Empyema frequently follows and may be serious.

Pericarditis is not uncommon. I have seen a most grave pericarditis with great effusion follow a pneumonia of a very mild type.

Endocarditis is frequent, especially in pneumonia involving the left lung.

Other complications are meningitis, edema of the lungs, delayed resolution, nephritis, and neuritis.

Prognosis depends on *age*; under twenty months the disease is usually fatal. Between the ages of two and eight years it is favorable if the child be not rickety. It is very favorable in young, adult life, but becomes a serious and grave disease in elderly people.

Toxemia alters the prognosis. Severe toxemia is always serious.

Situation.—Central pneumonia is serious and next in gravity is the upper lobe.

Symptoms.—Active delirium causes exhaustion. Low temperature with rapid pulse is grave. Pulmonary edema is usually a forerunner of a fatal termination.

If the crisis be prolonged beyond the ninth day and resolution be delayed, be suspicious of tubercular involvement.

Course.—The disease may terminate by resolution and absorption and excretion of the exudate. Resolution may be slow and delayed but eventually be complete. Chronic interstitial pneumonia may result. Gangrene or abscess of the lung may follow, with fatal termination.

Care and Management.—The germs of pneumonia, as those of tuberculosis, are probably distributed in the dry dust of the air, and thus gain entrance to the respiratory tract of the human organism. These germs if they be particularly virulent or if the resistance of the individual be lowered, will begin to multiply. It will thus be seen that if a person is to be protected from contracting pneumonia, he must maintain his bodily resistance and not expose himself to such debilitating influences as cold, wet, poorly ventilated apartments, etc.

Pneumonia is also without doubt a communicable disease.

General Management.—The patient should be in a well ventilated, large room with plenty of air. He must remain quietly in bed and not be allowed to leave it until at least ten days after the crisis. Absolute rest is a necessity of prime importance; the patient is not to exert himself in any way. There are many examples of a sad and fatal ending of a pneumonia patient who seemed in excellent condition, but who, thinking himself strong, moved suddenly in bed and caused a fatal dilatation of the heart.

The *diet* should be light, very nourishing and chiefly liquid. Milk will form the main article of diet and may be supplemented daily with a raw egg or two, albumin water, and some standard preparation of predigested beef. After the crisis semisolid and solid articles of food may be given gradually.

The *bowels* should be kept open by enemata. If the *temperature* be high, *nervous symptoms* prominent, and the heart action weak, hydrotherapy should be resorted to. Baths should not be given as freely as in typhoid fever. Three or four in twenty-four hours are sufficient. The water used should be about 85° F. or 90° F.

The continuous use of the ice-cap is a most excellent means of applying cold, and is agreeable and comfortable to the patient. An occasional alcohol rub will also serve its purpose.

Sleeplessness is one of the most troublesome symptoms of pneumonia. If the physician does not care to resort to hypnotics for certain reasons, then local measures must be used. A hot drink, an ice-bag to the head, a mustard foot bath, or a tepid sponge are all serviceable.

For the severe *pain in the side*, usually prominent in the beginning of the attack, nothing is more useful as a local application than an ice-bag. If the patient object to this, a mustard paste may be substituted, or hot fomentations.

The *heart* is the one organ on which the bulk of the burden falls. It is to this organ that a most careful vigilance must be directed. If the rate become high, the action irregular and tumultuous, or the rhythm

altered, the nurse will understand that the organ is beginning to be affected and the physician's attention should be called to it immediately.

For a tumultuous heart the ice-bag is of most valuable service.

During the *crisis* support and stimulation is of paramount import.

The drugs generally used in this disease for heart stimulation are digitalis, strychnin, alcohol, and atropin. If a very rapid stimulation be necessary as at the crisis, aromatic spirits of ammonia or the compound spirits of ether may be given every hour or two in half-dram doses, well diluted.

If cyanosis and dyspnea are present, then oxygen may be administered. In profoundly toxic cases, the use of normal saline solution as a hypodermoclysis is very useful.

It may very rarely fall to the lot of a nurse to perform or assist at a *venesection*. This is generally performed on the front of the arm at the elbow joint.

The part is first thoroughly cleaned as for a minor operation. A rubber bandage or tourniquet is placed around the arm above the elbow, causing the veins below to become very prominent. An incision one-half inch in length is made over the site of one of the veins, generally the median cephalic. When the anterior wall of the vein is incised the flow of blood is free, provided the tourniquet is not so tight as to interfere with the arterial supply of the forearm. When sufficient blood has been removed, from one-half to one pint, a sterile pad is placed over the incision and

a bandage firmly applied. The dressing need not be removed for five or six days.

Management of Pneumonia in Children.—The care of a child ill with pneumonia differs somewhat from that of an adult. The child should be confined to bed in a large, airy room. The temperature should be equable (about 68° F.). Quiet should prevail; loud talking within the room or in hearing distance of the patient is to be prohibited. Fresh air and ventilation are of prime importance.

Dr. Wm. P. Northrup of New York has said: "If you wish to kill a child with pneumonia, then place the crib in a far corner of the room with a canopy over it. Have the temperature of the room 80° F. Have many gas jets burning, shut the doors and windows, place a large poultice around the child's chest, and have a few friends in the room."

The *diet* should consist of milk only. If the child be very young, the milk should be modified as given in the chapter on "The Diet of the Sick." Special care must be given to the diet. Milk very frequently causes distention of the abdomen which seriously interferes with the action of the heart. Water should be freely given.

The *bowels* must be evacuated at least once a day.

Fever in a child is not as significant as in an adult. Often it need not be treated, unless it mounts very high, or is accompanied by restlessness and nervous phenomena, when tepid sponges and cool packs will be very serviceable.

A thick bath towel is immersed in water at 85° F.

to 90° F., and then wrapped about the child's chest, and trunk, and a light blanket thrown over the child. If in ten minutes the results are not satisfactory, repeat the procedure using water which is a little cooler.

Cold and clammy feet are often seen in this class of cases. In these patients a hot foot bath is of greatest benefit. Watch the feet! Counter irritation to the chest in the form of a weak mustard paste is often serviceable.

Convalescence in pneumonia, as a rule, is very rapid and may be greatly enhanced by nourishing diet and tonics.

CHAPTER XVII.

DIPHTHERIA.

Definition.—Diphtheria is an acute, infectious fever, caused by the Klebs-Löffler bacillus and characterized by the pseudomembranous inflammation of certain mucous membranes and by general toxemia.

Etiology.—The *exciting cause* is the specific bacillus mentioned above. *Predisposing causes* are exposure to cold and wet; tonsilitis and pharyngitis, which lessen the resistance of the mucous membrane. The time of greatest susceptibility is between the ages of six months and six years.

The bacilli themselves usually remain at the site of the local lesion, but the toxins which they produce are absorbed and give rise to the general toxic symptoms.

The tonsils afford an excellent residence for the germs as the crypts of the tonsils usually contain material upon which the bacilli may subsist and also provide two important requisites to the multiplication of bacteria; namely, heat and moisture.

At first only a hyperemia of the mucous membrane is produced, but later an exudation is thrown out, which sinks into the tissues and is followed by a necrosis of the superficial layers, forming a false or pseudomembrane. Great edema of the parts and abscesses may develop.

This pathologic process just described may occur on any mucous membrane, as of the tonsil, pharynx, larynx, nasal cavity, esophagus, stomach, vagina, conjunctiva, etc.

The membrane is at first gray but soon becomes of a dirty brown color. It cannot be readily removed, and if taken off, leaves a raw, bleeding surface.

Degeneration of the nerves, heart, kidneys, and liver are common.

Symptoms. — The disease usually begins insidiously with malaise, loss of appetite, feverishness, sore throat, and difficulty in swallowing. Chilliness or a chill may usher in the attack.

The throat is at first reddened, and soon white patches appear on the tonsils and pillars of the fauces. These patches soon coalesce and spread to the soft palate. The patches first gray, become brownish and are not easily detached. These patches may be confined to the larynx or nasal cavity with little or no involvement of the tonsils and soft palate.

The patient becomes more or less hoarse and a brassy cough develops, especially if the larynx be affected.

Prostration is marked. The patient becomes rapidly anemic. The pulse is rapid and feeble. Nasal breathing may be difficult. The glands of the neck become enlarged.

The *temperature* varies but does not reach a great height unless severe toxemia or complications occur.

In the *laryngeal form* there is hoarseness which may be succeeded by aphonia. The cough is barking and brassy. There are paroxysms of dyspnea and cyanosis.

The symptoms become worse at night. This form is usually very severe.

Complications and Sequelæ.—*Hemorrhages* may occur in the skin, kidneys, or nose, due to a fatty degeneration of the vessel walls.

Pneumonia is a very common complication.

The toxins of diphtheria seem to have an especial affinity for the *heart* and cardiac degenerations are of frequent occurrence.

The *kidneys* are also attacked by the toxin and Bright's disease often complicates diphtheria and shows itself by an increase of albumen in the urine, and the presence of casts and blood.

The enlarged *cervical glands* may soften and ulcerate.

The most important sequelæ are the nerve degenerations with their accompanying paralyses. The nerve sequelæ occur as a rule after convalescence has advanced for two or three weeks.

When the nerves of the pharynx and surrounding structures are involved there results a series of characteristic paralyses. The muscles of the pharynx and soft palate, as a rule, are the first to suffer. The voice takes on a nasal tone, food given by the mouth regurgitates through the nose, swallowing is difficult and impeded.

Other nerves of the body are also affected. There may be strabismus, ptosis, loss of power of accommodation, and facial paralysis may occur. The muscles of the neck may be affected and weakened when the head will lean to one side or roll about on the shoulders.

The upper extremities are rarely involved.

The legs may be affected and the knee jerks diminished or lost.

Prognosis.—This depends on the early use of antitoxin and the complications. Before the use of antitoxin, the mortality was from forty to seventy per cent.

Mortality of cases treated with antitoxin on first day 1 per cent.

Mortality of cases treated with antitoxin on second day 4.3 per cent.

Mortality of cases treated with antitoxin on third day 14.2 per cent.

Mortality of cases treated with antitoxin on fifth day 19 per cent.

Involvement of the larynx, complications of the heart and kidneys are very grave.

Transmission.—The excretions from the nose and mouth are loaded with infection. Therefore, they should be carefully collected, and not thrown on the carpet or placed in handkerchiefs and allowed to lie around. These excretions when dry become pulverized and are then suspended in the air and inhaled, thus spreading the disease. During the coughing spell the excretions may be discharged into one's face.

The infection may also be conveyed on eating utensils, pencils, clothing, etc. The germs may linger in the throat for weeks after the disease subsides.

Care and Management.—After the administration of the antitoxin there is little to be done besides preventing the spread of the disease, treating the disease

locally, attending to the comfort of the patient, and being prepared to combat complications should they arise.

Prevention of the spread of the disease is very important. It is hardly necessary to say that absolute isolation of the patient is the first requisite. Members of the family are not to be allowed in the patient's room. All persons in the house, or who have been exposed to the disease, should be immunized by small doses of antitoxin (500 units). If objection be made to this, then at least those who have never had the disease should be protected by this immunizing dose of antitoxin.

The room in which the patient is to lie should be large, airy, light, and capable of being ventilated. If a room with a fire-place can be used, it would afford better ventilation. All furniture, hangings, etc., that are not essential to the comfort of the patient and nurse should be removed. A comfortable bed, a large table, and one or two chairs is all the furniture necessary.

The temperature of the room should be kept equable, at about 65° F. Avoid having the patient exposed to draughts. A separate set of eating utensils should be used in the sickroom.

Allow no uncovered dishes of food or medicines to remain about the room. When the patient has drunk all the milk he cares to, do not place the glass containing the residue of milk on the table, but remove it at once and cleanse it.

Always have a basin of some antiseptic solution handy, preferably corrosive sublimate solution (1-1000).

Keep the floor and furniture scrupulously clean. If dishes are washed in the general kitchen, they should be thoroughly immersed in a strong antiseptic solution before leaving the sickroom. Do not place metallic dishes, etc., in solutions of corrosive sublimate.

Bed clothing and the patient's gowns should be frequently changed. Soak well in a strong antiseptic solution before sending them to the laundry.

A few words to the *nurse* about the protection of herself will not be here misplaced. Always immerse your hands in an antiseptic solution after attending to the patient. If it be required of you to make local applications to the throat or nose of the patient, be very careful as you are on dangerous soil. It is well to hold, or have held, a large square of glass (at least twelve inches square) between your face and that of the patient when making applications. When the patient coughs, which he is liable to do when you are making local applications to the throat, myriads of the germs may be expelled.

Spray your nose and throat frequently with some antiseptic solution. Do not sleep or eat in the patient's room.

The *diet* is the same as in any acute febrile disease; namely, milk, gruels, broth, etc. It is very important that food be given regularly and that the patient get a sufficient quantity as the whole system is greatly depressed, and nourishing and easily assimilated food will help the system to overcome the action of the toxins.

The same care must be exercised in regard to the excretions and secretions as in typhoid fever. In diphtheria the excretions of the nose and throat are of

special importance as they are exceedingly virulent. Soft linen cloths or pieces of old muslin should be used for collecting the nasal and pharyngeal secretions. These cloths when soiled must be burned immediately and no attempt should be made to wash and use them again. Do not use cups for collecting the sputum, for in expectorating in a cup more or less of the material is sprayed into the air.

Local Treatment.—It is very important to keep the mouth, nose and throat scrupulously clean. This may be done by the judicious use of antiseptic solutions in the form of spraying, atomizing, swabbing, gargling, and douching. Solutions to be used for this purpose are numerous; boric acid, four per cent; potassium permanganate, one to two thousand; and peroxide of hydrogen, one to eight.

Local applications to the false membrane itself was a prominent part of the treatment before the days of antitoxin, but they are seldom employed now.

General Treatment.—The administration of diphtheria antitoxin holds first place by far in the general treatment of this disease. The initial dose of the antitoxin must be of sufficient quantity. At least three thousand units should be administered and repeated at short intervals until the required action is obtained. The danger is not in giving too much, but in giving too little.

The use of antitoxin should be followed, in at most twelve hours, by a decrease in the severity of all symptoms. The temperature is lessened, restlessness is quieted, sleep is oncoming, and the patient becomes brighter. The local manifestations of the disease show

improvement, the swelling and edema of the mucous membrane is lessened. The edges of the false membrane begin to retract and to quickly disappear.

The duration of the disease is shortened and the prognosis is greatly brightened. If any organic changes have taken place in the nerve fibers or the heart, these are not repaired by the giving of antitoxin, but their advance may be checked.

Certain *ill effects* of but minor importance sometimes follow the administration of antitoxin, and are due, not to the antitoxin, but to the horse serum of which it is composed. The nurse should bear in mind these ill effects so that if they occur, she will understand their cause.

These complications may appear in the form of a rash, which is an erythema in character and may resemble the eruption of scarlatina or of rubeola; or it may be of an urticarial nature appearing as small wheals like a mosquito bite, and may itch. The rash may occur within ten minutes or many days after the injection of antitoxin. A complication may occur in the joints characterized by swelling of the joint and more or less pain. The temperature may mount very high.

These ill effects are not dangerous, but unless expected, may cause some confusion.

Method of Administration of Antitoxin.—The site of injection is elective: the femoral or gluteal regions, or preferably in the intrascapular space. The area should be well cleaned with soap and water and then treated with an antiseptic solution and rinsed with sterile water to remove the antiseptic. Some physi-

cians simply clean the area with alcohol. The syringe and needle with which the antitoxin is to be given should be sterilized. At present all the larger manufacturers of antitoxin provide a sterile syringe and needle with the serum. The needle should be inserted as is a hypodermic needle, but more deeply, and the serum slowly injected.

Fever if high, is treated with cold sponges and baths as in other febrile disorder.

The *soreness of the throat* and neck is best relieved by the application to the neck of an ice-bag. Small pieces of ice in the mouth are very useful in older patients.

For *swollen glands* apply an ointment of ichthyol or belladonna.

In *laryngeal forms* the air of the rooms may be moistened by means of a steam kettle; or filling the room with the vapors from ten grains of burning calomel is useful.

In the *nasal form* the nose should be irrigated with normal saline solution.

Intubation was employed to a considerable extent before the days of antitoxin. It is well for a nurse to know how to prepare a child for the operation, so in case she be called upon, she will be acquainted with the methods.

Fold a sheet or blanket until it is just wide enough to extend from the chin of the child to the feet. Wrap this about the patient so that the whole body except the head and neck is included. Have the arms of the child extended along the side of the body before applying this binder. The sheet should be applied somewhat

tightly to prevent the child from struggling with the arms and legs. Pin the binder snugly but do not have a bulky roll at the upper end as it will interfere with the operator.

The nurse sits upright, preferably on a stool, placing the child's wrapped legs between her knees and holding them very firmly in this position. With her hands the nurse grasps the child's elbows, having the head resting against her left shoulder. The object is to thoroughly immobilize the child without interfering with its respiration or the operator's field of work.

Another nurse stands behind the child and grasps its head firmly between her two opened hands; with her left hand she also steadies the mouth-gag, which is placed in the child's mouth on that side. The patient is now in the best position for intubation.

Feeding the intubated patient is the next perplexing problem. Swallowing is more or less painful and difficult. Particles of food often enter the larynx and cause not only severe fits of coughing, but may also cause an expulsion of the tube during the paroxysm.

There are several methods of feeding an intubated child. In the first method the child's head is placed lower than the level of the body and then fed slowly. Place the child on its back across the lap of the nurse with its head low. This may be accomplished by having a pillow under the child's buttocks, or by the nurse raising her knee on that side. Then feed the patient either with a spoon or from a nursing bottle. This is very awkward to the child at first, but it soon learns to swallow without difficulty or coughing.

A second method is by passing a small rubber

catheter through one of the child's nostrils, down the esophagus into the stomach. Care must be taken that the catheter does not enter the larynx and intubating tube. With a small funnel inserted into the free end of the catheter milk can be easily introduced into the stomach.

If both of these methods fail, then rectal alimentation must be employed.

Quarantine.—The patient should remain in bed ten days after the disappearance of the membranes, when the throat is examined for the presence of the diphtheria bacilli, which, if found, will prolong the period of quarantine. If none are found by repeated examination, and all symptoms have disappeared, the child may be permitted gradually to resume its former mode of life.

The room, all its contents, and the clothes of both patient and nurse must be thoroughly disinfected. For the method of disinfection see the Chapter on Scarlet Fever.

CHAPTER XVIII.

ACUTE ARTICULAR RHEUMATISM.

Etiology.—The exciting cause of the disease is at present unknown. It is supposed to be of bacterial origin.

Predisposing causes are exposure to cold and wet especially; it is more prevalent in damp seasons and after prolonged dry seasons. Early adult life is a predisposing factor, particularly between the ages of ten and thirty years. Occupations which expose the individual to the elements excite the disease, which at times seems to occur in epidemic form. Most cases are seen in the latter part of Winter or Spring.

The disease is thought to be caused by a germ because it begins with symptoms generally connected with the acute infectious diseases, as sore throat, malaise, headache, etc.; because there is a tendency to relapse; because it occurs in epidemic form; because the symptoms and complications resemble those of bacterial diseases; and, finally, because it is usually accompanied by anemia.

Reasons for believing it not to be due to germs are: No germ has been found; it has a hereditary tendency; it recurs in the same individual.

Another theory ascribes its cause to a toxemia due to the presence of lactic acid or uric acid in the blood; and another holds it to be of nervous origin.

Allies of rheumatism are chorea, follicular tonsilitis, and torticollis.

Symptoms.—The disease may be ushered in gradually by a few days of discomfort, malaise, loss of appetite, and other indefinite symptoms; or it may commence suddenly with a chill or chilliness. Sore throat and tonsilitis are frequent forerunners of acute rheumatism. They occur in from thirty to sixty per cent of cases. In the course of a few days the joint symptoms begin to make their appearance. The joints which are attacked become very painful, and redness and swelling of the affected joints soon appear. The joints become exquisitely tender and even the weight of light bed clothing cannot be borne. The tissues about the joints may be greatly swollen, or even the whole limb.

The *pain* is excruciating and is produced by the slightest movement. One characteristic is the rapid migration of the joint symptoms.

The *temperature* varies from 102° F. to 103° F., but may reach a very great height. Hyperpyrexia is not uncommon in acute rheumatic fever. The pulse becomes rapid and may be irregular.

A very characteristic symptom is the profuse, drenching *sweats*. The perspiration is acid and has a sour, foul odor. The temperature falls after the sweat. Miliaria and sudamina are of frequent occurrence.

The *tongue* is coated, the bowels are constipated, and the appetite is lost.

The *urine* becomes very acid, scanty in amount, dark in color, high in specific gravity, and contains an abundance of urates. The person becomes very anemic due to an alteration of the blood by the toxic substance.

Complications.—Endocarditis, pericarditis, and myocarditis are the principal cardiac complications. Of these *endocarditis* is the most frequent and most serious. The mitral valve is usually affected. Small vegetations form on the line of closure of the valves. In these vegetations germs have been found. Rise in temperature, palpitation of the heart, and change in the pulse character will denote the onset of this complication.

Pericarditis may be of the dry or moist form. The moist form may be serous, purulent, or hemorrhagic. It may develop at any stage of the disease. Heart complications are known to have developed before the joint symptoms have appeared.

Pleurisy with effusion of one or both sides may occur.

Other complications are hyperpyrexia, meningitis, delirium, convulsions, coma, chorea, pneumonia, nephritis, erythema nodosa, purpura, and hematuria.

Course.—In mild cases the joint symptoms disappear in two or three days, the temperature falls but the sweats may continue. Relapses are frequent and point to an infectious nature. Hyperpyrexia, meningitis, and heart complications are unfavorable. Death may occur suddenly, due to myocarditis. The disease may become subacute or chronic.

Care and Management.—The room in which the patient is confined should be airy and well ventilated.

Absence of draughts of air is very essential. The temperature of the room should be kept constantly at or near 68° F.

The *patient* should wear a light flannel gown and undershirt, as flannel absorbs moisture very easily and will protect the patient from the cold. The patient for the same reasons should sleep between blankets and not sheets.

The *diet* is to be liquid. Milk will form the bulk of the diet during the acute stage. If whole or undiluted milk does not agree with the patient, it may be diluted with Vichy, barley water, limewater, or even plain water. Buttermilk, skim milk, albumin water may form part of the diet. No meat or meat preparations should be given during the course of the disease.

Thirst is as a rule constant and great. It may be relieved by providing water freely. Lemonade, oatmeal water, and seltzer water are allowable.

The basis of all *medication* is salicylic acid or some of its salts, the salicylates. These preparations are more or less disagreeable to take and may upset the stomach. The patient will consider it a favor if these medicines be administered in an agreeable form. The salicylates may be given dissolved in milk, or dissolved in milk and peptonized, forming a curd or sort of a salicylized junket. Another palatable form is prepared by dissolving the drug in water and adding some glycerin.

Local Measures.—These are without number. Of all applications there are three or four which I have found of special service. First and foremost the *ice-bag*. Even the mentioning of this to the patient will

make him shudder. He will even rebel against it. It may require a little diplomacy on the part of the nurse to carry out this method, but after the first application the patient does not object as the results are very gratifying. Do not place the bag next to the skin but have a piece of woolen cloth intervene.

Second, an application consisting of one dram of salicylic acid, one ounce of oil of wintergreen, and up to eight ounces of cotton-seed oil.

Third, a twenty or fifty per cent ointment of ichthyol, the base of which is lanolin.

Fourth, a preparation consisting of one part of guaiacol and three parts of glycerin.

Other external applications are methyl salicylate; lead and opium wash; Fuller's lotion (consisting of sodium carbonate, one ounce; tincture opium, one ounce; glycerin, three ounces; water, twelve ounces); chloroform liniment; tincture of iodine; sulphur powder; and vinegar.

Fever is treated the same as in other febrile diseases, by the application of cold in the form of sponges, packs, and baths.

Delirium is quieted by hydrotherapeutic measures. It is important to remember that delirium may result from the exhibition of salicylic compounds. A patient of the author's, seen for the first time at the end of the first week of the disease, had had no delirium. Within twelve hours after beginning salicylates the man became very delirious. The delirium ceased with the withdrawal of the salicylates but returned when the medication was again instituted.

Careful attention must be paid to the *heart* as this organ is often profoundly affected in rheumatism.

Convalescence.—The patient is not to get out of bed until the temperature has been normal for a week, and not even then if any heart complications are present. The diet is to be gradually increased until full diet is resumed. Meats, especially the red ones, are to be but sparingly given. Special care must be taken to avoid exposure to cold and wet. Light massage of the joints and muscles is beneficial.

CHAPTER XIX.

MALARIAL FEVER.

Etiology.—The *exciting cause* of malarial fever is probably the plasmodium of Laveran. This organism is not a bacterium but one of the protozoa.

Predisposing Causes.—The disease is especially active in the temperate and tropical zones; in swampy and marshy regions; along rivers, especially those streams which overflow their banks; in new agricultural districts and near large excavations.

Poor surface drainage is one of the main factors in predisposing the disease. The most cases appear in Spring and Summer, especially after a prolonged dry season. The winds seem to carry the disease from place to place.

Symptoms.—The disease may be preceded by prodromal symptoms as malaise, loss of appetite, suboccipital headache, feeling of uneasiness in the epigastrium, nausea, and a desire to yawn.

The paroxysm is divided into three stages; namely, the cold stage, the hot stage, and the stage of sweating.

Cold Stage.—There is general chilliness, the patient shivers, the face becomes pinched, the lips blue, and a pronounced chill occurs, lasting from five to sixty

minutes or more. The surface of the body is pale and cold but the temperature is raised (103° F. to 106° F.). The pulse is rapid, small, and hard. The urine is increased in amount.

Hot Stage.—This stage develops in five to fifteen minutes after the former. Instead of chilliness or chills there is a feeling of warmth, the formerly pale skin becomes flushed, the face congested. The pulse hitherto small and hard is now full and bounding. The headache is intense and throbbing. The urine

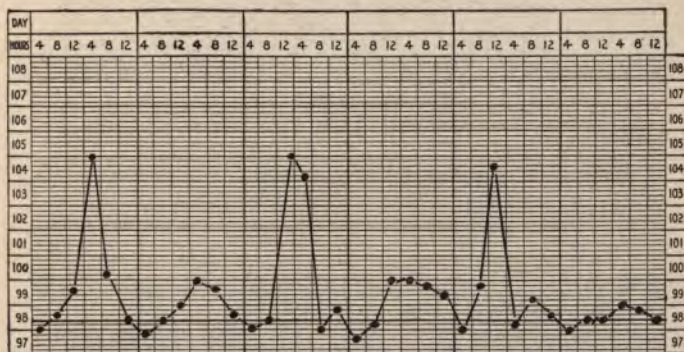


FIG. 14.—Temperature chart of intermittent malaria (tertian).

becomes scanty in amount. The patient is very thirsty. The temperature varies but a fraction from that in the cold stage. Delirium is common. This stage may last from thirty minutes to five hours.

Sweating Stage.—The pains and anxiety of the former stages are relieved by the advent of this stage. Sweating usually begins on the forehead and extends over the whole body. The pain and feverishness are

decreased and complete relief is ushered in by refreshing sleep. This stage lasts from one to three hours.

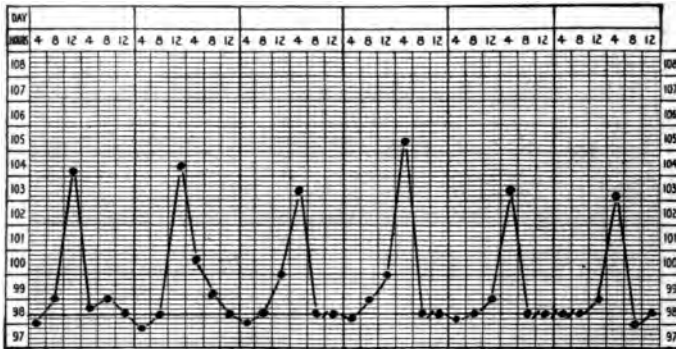


FIG. 15.—Temperature chart of intermittent malaria (quotidian)

The whole paroxysm lasts from two to fifteen hours. Throughout the paroxysm the spleen is enlarged and

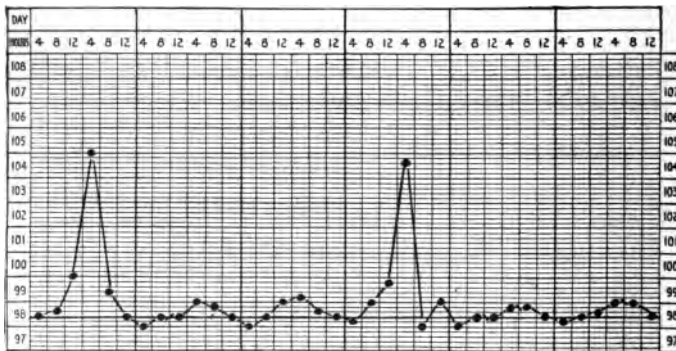


FIG. 16.—Temperature chart of intermittent malaria (quartan).

tender and the viscera are congested. *Herpes* of the

lips are common in malaria, the *tongue* is coated, constipation or diarrhea may exist.

Fever.—The temperature rises in the cold stage and continues high until the sweating begins, when it falls. The temperature rises with each paroxysm and the frequency depends on the character of the infection. In the *tertian* type the paroxysms occur every other day. In the *quotidian* they occur daily. In the *quartan* on the fourth day. There may be a double infection of the same type or mixed infections of the various types.

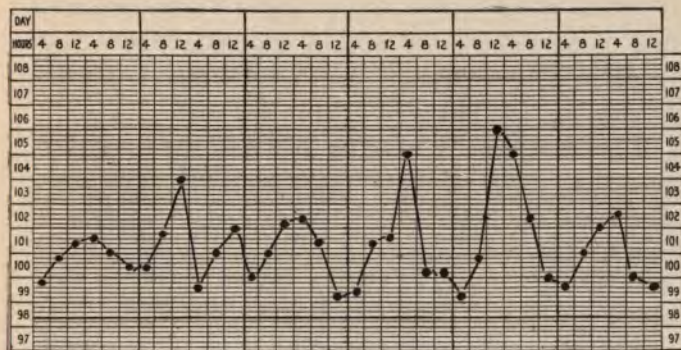


FIG. 17.—Temperature chart of remittent malaria.

Varieties.—There are four principal forms of malaria: intermittent, remittent, pernicious, cachectic. The intermittent form is described above.

Remittent form, also known as bilious remittent fever, estivo-autumnal fever, and irregular malaria.

Symptoms.—Malaise and chilliness. The fever is irregular, rises gradually, and usually drops by lysis.

The paroxysm is not well defined. The face is flushed, the conjunctivæ are injected. Nausea, vomiting, and epigastric pain are very common. Jaundice occurs in many cases. Delirium is frequent. The general course resembles typhoid fever to a great degree.

Pernicious Malaria.—This is a very grave form. There are three types, the *algid*, the *comatose*, and the *hemorrhagic* forms.

The Algid Form.—As the name would indicate, this form is characterized by the coldness and low temperature. Vomiting is frequent, prostration is very great, the pulse is rapid, feeble and small; the temperature may be subnormal; the urine is suppressed, very dark jaundice is characteristic, and collapse may follow an exhausting diarrhea.

The Comatose Form.—The chill is of short duration or absent. The skin is hot, the temperature is high. The nervous symptoms are marked. The delirium is followed in many cases by coma and death, or the unconsciousness may last ten or twelve hours and then cease. A second paroxysm is generally fatal.

The Hemorrhagic Form.—This form is characterized by the tendency to hemorrhage from the mucous membranes and the kidneys. There are no febrile paroxysms, hematuria is common, jaundice is not as marked as in the *algid* form.

Malarial Cachexia.—This is a chronic malarial intoxication, caused by a continued progress of a simple form. It is characterized by its great anemia and chronic enlargement of the spleen. There is a tendency to bleeding from the mucous membrane, uterus,

and kidneys. The skin is sallow. Headaches are common and severe.

Prognosis.—Always favorable in the simple intermittent form, although chronic malarial cachexia may follow. Favorable in the remittent form. Always grave in the pernicious forms, especially in the algid type.

Care and Management.—Malaria is transmitted by means of the mosquito, which acts as the intermediary host. Thus it will be seen that if a region infected with malaria is freed of mosquitoes, the disease will gradually disappear. The breeding places of the mosquito are stagnant pools and slow flowing waters. The water found in road ditches, in old cans, in rain barrels, in tree stumps, in the angles of the boughs and the tree trunk, along the sides of slow-flowing creeks, forms an excellent field for the development of the larvæ of the mosquito.

All road ditches and puddles should be filled with earth to prevent the water from collecting. Rain barrels should be covered with very fine meshed netting. Holes in trees should be packed. Pools of large size should be treated with kerosene oil. This forms a film on the surface of the water, preventing the embryo mosquito from getting fresh air and therefore causing its death.

Small fish in a stream, pond, or fountain will eat the larvæ and thus prevent to a great extent the development of the mosquito in these waters.

The house should be protected from the invasion of the mosquito by means of screens. Bed canopies are also useful barriers.

General Management.—In the intermittent form of malaria the patient must be confined to bed during the paroxysm, but may be allowed to leave the bed between the attacks if he feel strong enough and object to remaining in bed. In the remittent and pernicious forms absolute rest in bed is a necessity.

The *diet* as in other febrile diseases is to consist mainly of milk and liquid foods.

Of all drugs used in the treatment of this disease *quinin* holds the first place. This drug acts directly on the cause of the disease, the plasmodia, and destroys their vitality. The object of the treatment is to prevent future paroxysms and not to stop the paroxysm which is in progress, as this cannot be done. There are two methods of giving quinin, in one massive daily dose; and in small divided doses with a larger dose before the expected paroxysm. By the former method the toxic effects of the drug may be excited.

As quinin is slow in absorption, the last dose should be given several hours before the oncoming attack.

If a purge, as calomel, be given an hour before the administration of the quinin, this latter drug will act much more quickly and better.

In some susceptible individuals the toxic effects of quinin, known as *cinchonism*, come on quickly and even after a comparatively small dose. The signs of this condition are ringing in the ears, vertigo or dizziness, nausea, vomiting, fullness of the head, impaired vision, and at times deafness.

During the *cold stage* the patient may be made much more comfortable by covering him well with blankets, placing hot-water bottles to the extremities,

and giving hot drinks. If the chill be very severe, inhalations of chloroform or amyl nitrite will be of service. Atropin by hypodermic is useful.

The *hot stage* is best treated by cool sponges or rubs. An ice-bag to the head is very grateful to the patient.

In the *sweating stage* the patient is made more comfortable by using such coverings as will easily absorb the moisture caused by perspiring.

The *remittent form* is managed on the same plan, more or less, as in typhoid fever. Absolute rest in bed, liquid diet, attention to the bowels and temperature. In case of tympanites, the turpentine stupes will be found useful.

Vomiting, which is very frequently present in this form, must receive especial attention. Small pieces of ice by the mouth and a mustard paste to the epigastrium are of benefit.

The *pernicious form* as has been stated is very grave and needs vigorous treatment. The purpose of prime importance is the prevention of a second paroxysm. Quinin is given in enormous doses. Stimulants are to be freely administered.

In the *algid type* the external application of heat is of prime importance.

CHAPTER XX.

ERYSIPELAS.

Definition.—An acute, infectious fever characterized by an acute inflammation of the skin and general symptoms of toxemia.

Etiology.—The *exciting cause* of erysipelas is the streptococcus erysipelatis which is said to be identical with the streptococcus pyogenes.

The germ gains entrance through some break in the continuity of the cutaneous or mucous surfaces. In cases of facial erysipelas the bacterium usually finds a portal of entrance in the nasal passages.

Certain individuals seem particularly predisposed. Some women have recurrent attacks at the menstrual periods. Relapses and recurrences are liable.

Symptoms.—*Constitutional.* Rigors or chills generally usher in the attack. Several days of malaise, frontal headache, and gastric disorders may precede the general signs. In twenty-four hours the local lesion is generally manifest.

The temperature rapidly becomes high (104° F.), the pulse rapid, prostration is more or less prominent. The tongue is dry. The urine is scant in amount, dark in color, of a high specific gravity, and contains albumen. The bowels are usually constipated. Delirium is not uncommon.

Local.—A small inflamed area of a dusky red color is first seen. The local lesion is painful and tender and a sensation of tension is frequent. The area of inflammation has a prominent well defined margin. There is more or less swelling which pits on pressure. The lesion spreads from the periphery while healing in the center. Migration is rapid and a great portion of the body may become affected.

In facial erysipelas the eyelids and surrounding tissues may become greatly swollen, and the eyes closed. The whole face is sometimes swollen beyond recognition. Blébs or large blisters are of frequent occurrence on the face, eyelids, and forehead. In four or five days the redness begins to fade and the swelling to decrease, and unless recrudescence occur the process is at an end.

Complications.—Pneumonia, pleurisy, pericarditis, and endocarditis are not uncommon. Nephritis is a very serious complication, as also is septicemia.

Prognosis.—A simple case usually results in recovery in about two weeks. The prognosis is less favorable in those individuals suffering from other diseases, as nephritis, and in alcoholics and during the puerperal state.

Chronic swelling of the parts and eczema are common sequelæ.

Care and Management.—This disease is of a general character and not simply a local disease of the skin, as it was formerly thought to be.

Complete *isolation* of the patient is the first requisite. A very mild case of facial erysipelas may excite in a susceptible individual a most severe and fulminating

form of the disease. Young children are especially likely to contract the disease, as are also women in the parturient stage. Dr. Goodell believed there is a relationship between puerperal sepsis and erysipelas.

The nurse or attendants should not come in contact with anyone suffering with an ulcer or an open wound of any kind, as these persons are very easily infected with erysipelas.

A nurse who has been attending a patient ill with erysipelas should under no circumstances undertake the care of a parturient woman until she (the nurse) is absolutely free from the danger of carrying infection. It will be safe to do pure medical nursing before entering surgical or obstetric service.

Rest in bed is necessary in the more severe cases, as the disease is very depressing. In the mild cases the patient may be up and around for part of the day.

The *diet* is of great importance and should be concentrated and very nourishing, as milk, gruels, eggs, etc. First because the disease is very depressing and prostrating, and secondly because recovery depends on the vitality of the patient, which can be kept in a good state only by providing the most nutritious foods.

The *bowels* should be kept open by saline laxatives and enemata.

Headache, which is often very trying, is relieved by the application of an ice-bag to the head.

Fever, if high, is lowered by means of sponges, packs, and baths.

Sleeplessness is overcome by a glass of hot milk, together with a hot foot bath and an ice-bag to the head.

The *kidneys*, which are liable to be affected in this

disease, should be kept active by giving the patient plenty of drinking water.

The *heart* should be carefully watched.

Of *internal medicines* the tincture of chlorid of iron, and some salt of quinin are most frequently given. These are simply mentioned in passing.

Antistreptococcic serum is much praised by eminent authorities.

We now come to *local measures*. These are manifold. Ichthyol probably holds the first place. Of all local applicants I have found it the most beneficial. It may be applied in one of several ways: as an ointment of twenty-five per cent strength, or dissolved in water or glycerin (1 to 4).

A most excellent method is by combining it with collodion and painting it over the lesions. This method causes exclusion of air, which is *very* important, and also keeps the medicament in contact with the lesion.

One important point to be remembered in the use of ichthyol is that it should be freely applied.

Other applicants are resorcin, which may be used alone or combined with ichthyol; solution of lead acetate; carbolic acid, one to twenty; bichlorid of mercury, one to one thousand; tincture of iodin; solution of boric acid; silver nitrate in a solution of one to three.

If the lesion be on one of the extremities, adhesive straps applied around the limb above and below the site are said to prevent its extension.

If the case be one of facial erysipelas, attention should be given to the nasal and pharyngeal cavities and to the mouth. These should be cleansed by anti-

septic solutions, as sprays, douches, and gargles. A one-to-eight solution of hydrogen peroxid is very good.

All dressings should be burned as soon as removed.

The nurse should scrub her hands thoroughly and immerse them in a one to one-thousand solution of bichlorid of mercury after each dressing and before eating her meals.

The patient should have separate towels, washcloths, and eating utensils.

After convalescence cheap articles of clothing should be burned and other pieces may be disinfected with the room, as described under Scarlet Fever.

CHAPTER XXI.

SEPTICEMIA, TOXEMIA, AND PYEMIA.

Definitions. — These terms are being constantly confused and interchanged. Each is a distinct condition and it is important that they be thoroughly understood. I will endeavor to define each in simple and concise form.

Toxemia is a morbid condition characterized by the presence of *toxins* in the blood. An example is diphtheria. In this disease the local lesion as a rule is on one of the mucous membranes of the upper respiratory tract. The germs themselves rarely leave the local site, but the toxins or poisonous products which the bacteria form are absorbed and enter the blood; then they are carried throughout the body and give rise to general constitutional symptoms.

Septicemia is a morbid condition characterized by the presence of *bacteria* and their toxins in the blood. Typhoid fever is an example of a septicemic condition. Here we find the typhoid bacillus in the circulation.

Pyemia is a morbid condition characterized by the presence of pus-producing germs in the blood, together with the formation of secondary purulent deposits or metastatic abscesses.

Sapremia is a morbid condition characterized by the presence in the blood of the products of decay or putre-

faction. For example: after a partial ectopic rupture a clot of blood will be found in the pelvis. This may soon be invaded by micro-organisms and decompose. The products when absorbed give rise to toxic symptoms.

All the conditions described above are referred to by the laity as *blood poisonings*, which in reality they are.

Etiology.—These conditions may be caused by any bacterium. *Toxemias* usually occur in the acute infectious diseases. *Pyemia* may follow any operation, being due to infection by pus-producing organisms, as the staphylococci and streptococci. *Sapremia* is frequent in incomplete abortion, in retention of the placenta in whole or in part, or of parts of the membranes; also in conditions accompanied by extensive sloughs.

Symptoms.—*Toxemia*. The general symptoms of toxemia are chill or chilly sensations, fever, headache, malaise, loss of appetite, restlessness, prostration, rapid pulse, and in pronounced cases delirium, coma, nausea, vomiting, and diarrhea.

Septicemia.—The symptoms are similar to those of toxemia but are much more severe. The chill may be pronounced, the fever is at first moderate but soon becomes high and runs a very irregular course with daily remissions or intermissions; the pulse becomes very rapid and feeble. Nausea and vomiting are not infrequent. Nervous symptoms are common: delirium, apathy, and convulsions (in the young). A very characteristic occurrence is the enlargement of the spleen and the lymph glands.

Pyemia.—This condition in most instances is ush-

ered in by a pronounced chill. The chills recur frequently, in some cases daily and more or less often. With the chill there is a rapid and high rise of temperature. These paroxysms recur. The temperature may reach 103° F. to 105° F. and is followed by a more or less profuse sweat, after which the temperature is again low. These phenomena resemble very much those of malaria.

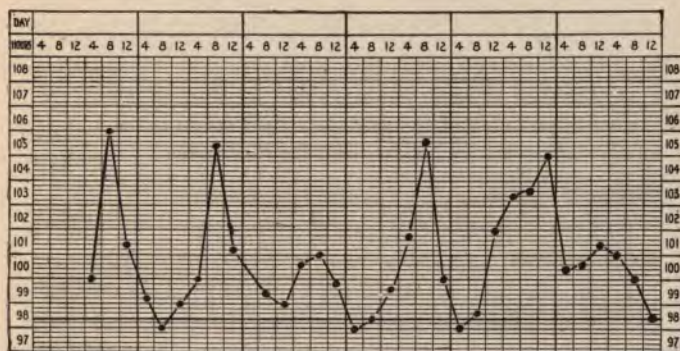


FIG. 18.—Temperature chart of pyemia.

The *general symptoms* are general malaise, headache, loss of appetite, nausea, and vomiting. As the disease progresses prostration becomes very marked, anemia develops, the skin takes on a sallow hue, diarrhea may be exhausting, and the patient may develop a low typhoid condition with delirium, subsultus tendinum, etc.

Abscesses may form in any part of the body: in the joints, subcutaneous tissues, or in the viscera.

Care and Management.—The outcome of these diseases depends largely on the nursing. Their course

is so irregular and varied, their character is so general that the treatment consists principally of supportive and expectant measures.

Support of the strength of the patient is the most important requisite. These diseases run their course and recovery depends on the vitality of the patient.

The patient's vigor is conserved best by absolute *rest* in bed and a most nourishing *diet*. Milk will form the basis of the diet and is to be supplemented with gruels, eggs in soft form, albumin water, broths, predigested forms of beef, etc.

Symptoms should be alleviated as they arise.

Fever, if it become excessive, is treated by the application of tepid or cool water in the form of sponges, packs or baths.

Delirium, which may occur, is also quieted by these same means.

Vomiting may be so severe that no food or medicine can be retained in the stomach. In these instances medicine must be given hypodermically if possible or by rectum. Nutritive enemata should be instituted. Oftentimes a mustard paste applied to the epigastrium will stop the vomiting. Washing out the stomach is of good service in selected cases.

Sweating, which is common, especially in pyemic cases may be lessened by bathing the body with alcohol, or a combination of alum one ounce, alcohol one-half ounce, and water two pints.

Stimulation is of frequent necessity. For general stimulation of the heart digitalis and strychnin by mouth are of greatest value. When rapid stimulation is necessary hypodermic injections of strychnin, ether,

or spirits fermenti are indicated; or give by mouth dram doses of aromatic spirits of ammonia or compound spirits of ether. The use of camphor dissolved in sterile olive oil is an excellent stimulant. It should be given by hypodermic and in one-grain doses.

Elimination of the toxins is of vital importance and should be encouraged by one or all of the following methods.

BY THE BOWELS.—The bowels should be kept open by means of calomel, or better, by saline cathartics, as magnesium sulphate (Epsom salts), or sodium and potassium tartrate.

In some cases of pyemia a colliquative diarrhea occurs. This should not be checked at once as it is one of nature's ways of expelling toxins. A large quantity of the toxins are excreted into the bowels; therefore, by emptying the intestines we get rid of a large amount of toxins.

Washing out the colon is of excellent service. I have found a most admirable method in the use of the Kemp double rectal irrigating tube, which allows a circulation of water to take place in the rectum and colon. The inflow tube is connected with the source of water, as a fountain bag or an irrigating jar; the outflow tube is connected with a large tub by means of rubber tubing. Normal saline solution is used in large quantities. In one case I used as much as fifty gallons of the solution.

The temperature of the solution used in colonic irrigation should be of such a degree that when it reaches the colon it is not above 99° F. If a long tube be used on the fountain bag, the temperature of the solution

may be 104° F. If a short tube be used, then 100° F. or 101° F. is enough. If the temperature of solutions, when large quantities are used, be too high, there is a liability of producing heat stroke, or of causing excessive fever in the patient.

BY THE SKIN.—Sweating is promoted by hot drinks, by wrapping the patient in hot dry or wet blankets, or by introducing heat under the bed clothing by means of a hot-air apparatus. Hypodermoclysis of normal saline solution is very useful.

BY THE KIDNEYS.—Give the patient plenty of water to drink. Encourage the flow of urine with the spirits of sweet niter. Hypodermoclysis of normal saline solution is of especial value in eliminating the toxins by the urine. They should be given as regularly as any medicine. One case of severe sepsis under my care was saved by the systematic giving of normal salt solution under the skin.

Use of Antitoxin.—Marmorek in 1895 announced the discovery of an antistreptococcic serum and also reported its successful use in many septic cases. Whether it be of any real value in general infections is yet to be ascertained. It is given in the same way as the diphtheria antitoxin, in doses of ten cubic centimeters.

The use of organic silver salts I think will, in the future, partially solve the treatment of general infectious processes.

PART III.

A D D E N D A .

CHAPTER XXII.

ANTITOXINS.

One of the greatest, if not the greatest advance in medical science during the last decade, was the production of substances which counteract the destructiveness of bacterial poisons.

Closely connected with the subject of antitoxins is that of *immunity*.

Immunity may be complete or partial, natural or acquired, temporary or permanent.

Natural immunity for the various infectious diseases is enjoyed by not a small number of persons.

Acquired immunity is obtained in various ways: By the injection of antitoxins; by modified virus and vaccines, as in smallpox; by the gradual injections of toxins; by the gradual injection of virulent cultures; by a previous attack of the disease.

All the above means bring about the same ultimate result, a stimulation of the body cells to form certain antagonistic bodies or antitoxins.

When bacteria gain entrance to the human body, they begin to multiply in number and form certain

poisonous substances known as *toxins*, and these circulate in the blood and cause general "blood poisoning" or *toxemia*. It is this generalization that causes the seriousness of the disease. The germs themselves, as a rule, remain in a local place. In typhoid fever the germs find their resting place in the coats of the bowels; in pneumonia, in the lungs; in diphtheria, on the mucous membranes of the larynx, pharynx, or nose. If the germs also enter the circulation and are scattered far and wide, the condition is known as *septicemia*. If the germs after being scattered about the body form abscesses, the condition is called *pyemia* and the abscesses are designated *metastatic abscesses*. While mentioning the different forms of "blood poisoning" I will call attention to a fourth form, known as *sapremia*. This is caused by a circulation in the blood of putrefactive material. A good example is found after labor and results from a retention of all or part of the placenta. The part that remains in the uterus will soon decompose and this material, when absorbed, will cause a certain septic condition known as *sapremia*.

The *toxins* mentioned above, when circulating in the blood, act upon the cells of the body and cause the appearance of symptoms characteristic of the disease. The body cells on the other hand, as soon as harassed by these toxins are stimulated to resistance, which is effected by the formation of bodies which antagonize the toxins, and are known as *antitoxins*.

If the toxins be weak or small in quantity, the body cells may overcome their deleterious action, and the individual survives. If the toxins be very virulent and

the resistance of the person be low, then the bacteria are the victors and the individual perishes.

If the toxins be virulent and the resistance of the person be great, the battle is more evenly balanced and the victory may be won by either side. First the laurels sway to one side and then to the other. It is in this type where the reinforcements sent by the physician will aid the patient in conquering.

As said above when toxins enter the body the cells of the body at once begin to produce defensive agents in the form of antitoxins. Before discussing the production of antitoxins a few definitions are necessary.

A *toxin unit* is ten times the amount of toxin required to kill in twenty-four hours, a guinea pig weighing two hundred and fifty grams.

An *antitoxin unit* is ten times the amount of antitoxin required to neutralize one toxin unit.

Production of Antitoxin.—In discussing the production of antitoxins I will follow the procedure used in producing diphtheria antitoxin.

A culture is made by planting live diphtheria bacilli in sterile bouillon and this is placed in a warm room to grow from four to seven days. The result is what is called a *virulent culture*. This culture is then attenuated by adding to it carbolic acid until it becomes a five-tenth per cent solution. It is then filtered through stone ware, which removes the germs and foreign matter and a clear solution results containing the toxins. This toxin solution is tested as to its strength by the inoculation of guinea pigs. The strength having been determined, it is ready for use.

For the production of antitoxin the horse is used

because of the large amount of blood it contains, because of its more or less immunity, and because of its easy management.

Into the muscles of the horse's neck is injected ten to twenty toxin units of toxin. In twenty-four to forty-eight hours the area will become red, swollen, and hot. The temperature becomes high and signs of depression ensue. After two or three days these symptoms disappear when another and larger dose of toxin is injected, and so on until enormous doses of this toxin are given. At the end of one to three months the serum of the horse's blood will be rich in antitoxin.

Test bleedings are made from time to time to determine the amount of antitoxin present and when sufficient is present the final bleedings are made every few days until twenty or more liters of blood are removed from the horse. About one-half of the bleeding will be serum which is collected in sterile vessels and is prepared to be sold as antitoxin.

The horse, after a short rest, is again injected with toxins.

If when the toxins are injected, there be antitoxin injected at the same time, the dose of toxin may be greater and the horse is immunized very rapidly, each successive injection containing less antitoxin and more toxin.

Varieties of Antitoxins.—Of all antitoxins, greatest success has followed the use of *diphtheria antitoxin*. The antitoxin should be administered as early as possible and in large, frequently-repeated doses. Antitoxin itself is not poisonous but the serum may cause disturbing symptoms.

The average curative dose is three thousand units, and for immunizing purposes, at least five hundred units should be given. The immunity is temporary, lasting from four to six weeks. (H. Biggs.)

Other antitoxins which have been produced with greater or less success are those against the streptococcus, tetanus bacillus, typhoid bacillus, bacillus of bubonic plague, yellow fever, pneumonia, cholera, etc.

CHAPTER XXIII.

BACTERIA.

In this chapter only such microorganisms as are concerned in the diseases discussed in this book will be considered.

A *bacterium* is a microorganism of vegetable origin. Bacteria cause changes in the substance in which they grow and form new products in themselves which they retain or throw out.

Classification.—Bacteria are classified in several ways.

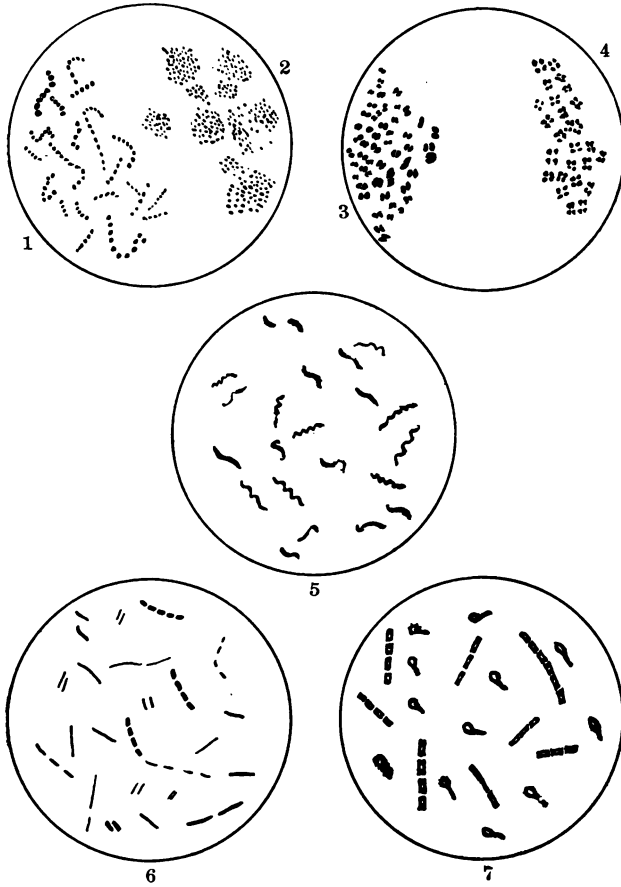
Parasites and *saprophytes*; the former are called such because they subsist on living organic tissue, the latter live on dead material.

Pathogenic and *non-pathogenic*; the former are the cause of disease and the latter do not cause disease.

Aerobic, those which require oxygen to maintain life. *Non-aerobic*, those which live without oxygen. *Facultative*, those which can grow with or without oxygen.

Micrococci are bacteria consisting of spheric bodies which may vary in their arrangement. If the spheric bodies are in the form of a chain, then that micrococcus is known as a *streptococcus*; if in the form of a bunch of grapes, that is, grouped, it is a *staphylococcus*; if in pairs, then *diplococcus*; if in series of fours, then *tetrads*; if in cubic form, then *sarcinæ*.

PLATE I.



VARIOUS FORMS OF MICROORGANISMS.

1, Streptococci ; 2, Staphylococci ; 3, Diplococci ; 4, Tetrads ;
5, Spirilla ; 6, Bacilli ; 7, Bacilli with spores.



Bacilli are bacteria which appear as small rod-shaped bodies.

Spirilla are bacteria which are curved.

Growth.—Bacteria multiply by *direct division*, in which the bacterium is divided into two segments and each of these grow as separate individuals. Or they multiply by what is known as *spore* formation, in which small glistening bodies appear within the bacterium, which are later set free and become independent bacteria.

Nutrition.—A medium for bacterial growth must contain nitrogen, which is supplied by albumen; carbon, which is supplied by sugar; and the presence of moisture. The medium also should be neutral or slightly alkaline in reaction, and be kept at a temperature about 98° F. Bacteria will adapt themselves to the soil and temperature to which they are subjected.

Media for the growth of bacteria are numerous; among the more common are the following:

Bouillon, which is made by compressing cold beef, and adding common salt and peptone to the juice. This juice is then boiled and filtered.

Gelatin is made by adding ten per cent of gelatin to the bouillon.

Agar-agar, made by adding one per cent of agar-agar to bouillon. Agar-agar, also known as Japanese gelatin, is a vegetable gelatin derived from a variety of seaweed growing along the coast of Japan.

Other forms of media are blood serum, glucose, potato, milk, blood and peptone solution.

Micrococci.—*Staphylococcus Pyogenes Aureus*. This is the most common bacterium of a pathogenic

nature found in the body. It is the cause of the majority of the circumscribed purulent inflammations. It derives its name from the fact that it is composed of spheric bodies arranged in groups (*staphylococcus*), that its presence in the body is accompanied by the production of pus (*pyogenes*), and that if cultivated on media it produces colonies with an orange color (*aureus*).

Other pathogenic staphylococci are the *staphylococcus pyogenes albus* and *staphylococcus pyogenes citreus*.

Streptococcus Pyogenes.—This is also a common microorganism and is the cause of most of the diffuse purulent inflammations. This bacterium is the cause of *erysipelas*. The secondary or mixed infections in pneumonia, tuberculosis, typhoid fever, and diphtheria are due to the streptococcus pyogenes in a majority of cases.

Pneumococcus.—This germ is the cause of lobar pneumonia. The pneumococcus is lance-shaped and surrounded by a capsule. The coccus is very sensitive to light, heat, and to germicidal solutions.

The pneumococcus is not only the cause of lobar pneumonia, but may also be the exciting agent of meningitis, peritonitis, pleurisy, pericarditis, endocarditis, and otitis media.

Diplococcus Intracellularis Meningitidis.—This bacterium is the cause of cerebrospinal meningitis. The germ is composed of two spheric bodies and is usually found situated in the pus cells; hence its name.

Bacilli.—*Typhoid bacillus* was first described by Koch and Eberth. The bacilli occur as small, slender,

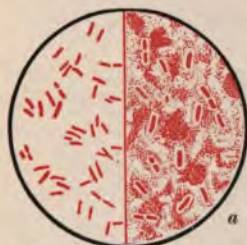
PLATE II.



Streptococcus pyogenes ($\times 700$).



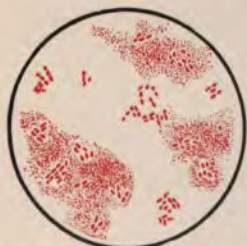
Micrococcus pyogenes aureus
($\times 1000$).



Bacillus pneumoniae, ($\times 800$);
a, as seen in sputum.



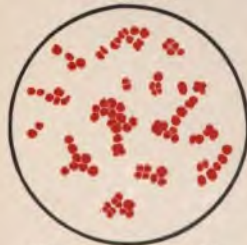
Bacillus typhosus, *a*, ordinary
form ($\times 1000$); *b*, flagellate
form ($\times 1500$).



Bacillus influenzae in nasal secretion,
($\times 1000$).



Bacillus diphtheriae, ($\times 1000$).



Micrococcus meningitidis
cerebrospinalis, ($\times 1000$).



Bacillus tuberculosis; *a*, ($\times 1000$);
b, ramified or branching form.

rod-shaped bodies. They do not stain readily and inoculations of the culture into animals are unsatisfactory as to results.

THE WIDAL REACTION.—If a drop of a typhoid bouillon culture be placed as a hanging drop on a glass slide and be examined under the microscope with an oil-immersion lens, the typhoid bacilli will be seen as small, rod-like bodies moving and wriggling about. If to this drop of culture be added some diluted serum obtained from a person supposed to be suffering from typhoid fever, the bacilli in a short time will become quiet and gather in groups if the person have typhoid fever. If the person be not afflicted with this disease, the movements of the typhoid bacilli are not altered by adding the serum to the culture drop.

The typhoid bacilli are eliminated from the body of the individual especially by the bowel movements and the urine.

Influenza bacillus or the bacillus of Pfeiffer is the exciting cause of influenza. The germ is very small and can be grown only in the presence of hemoglobin. It may persist in the nasal and pharyngeal cavities for months after the patient has recovered from the disease.

Outside of the human body this germ has but little vitality; it dies in a few hours and cannot live in dried sputum.

Diphtheria bacillus is also called the Klebs-Löffler bacillus from the men who first described it. The bacillus is irregular in its outline, occurring as straight or curved rodlike bodies with clubbed ends. They are found in diphtheria on the surface of the affected mu-

cous membrane. They here form certain toxins which are absorbed and cause the general symptoms of a toxemia. Locally the bacilli cause a death and liquefaction necrosis of the superficial layers of the mucous membrane, forming a false or pseudomembrane.

To combat the toxins of this bacillus a substance known as *antitoxin* has been found. (See Chapter XXII).

Tubercle Bacillus.—This bacillus occurs as small slender rods slightly bent or curved. They do not produce spores and grow with difficulty on media. They are very resistant to outside influences and will live for a great length of time in dried sputum.

TUBERCULIN.—This substance when injected into a person will produce a certain reaction and is of diagnostic value. The *reaction* is local and general. The local reaction consists of redness, swelling, and tenderness; the general reaction consists of a rise of temperature, general malaise, pain in the back, head and legs, nausea and vomiting, and at times a diffuse eruption.

Tuberculin is prepared by taking a five-weeks' glycerin-broth culture of tubercle bacilli and evaporating it to one-tenth of its original volume, and filtering.

The test is made by injecting into the person one-half milligram of tuberculin. In twelve hours the reactions discussed above will appear. If no reaction occur, the test should be repeated in a few days, using more of the tuberculin. The usual place to give the injection is in the skin between the scapulæ.

CHAPTER XXIV.

URINE AND ITS EXAMINATION.

Amount.—The amount of urine voided in twenty-four hours is about fifty or sixty ounces. The quantity varies greatly in health.

Water is eliminated from the body principally by the kidneys, skin, and bowels; therefore, whenever the amount of water drunk is increased, the daily amount of urine voided is increased provided the skin and bowels are not stimulated to excrete in excess of their normal.

In Winter when there is but little sweating the urine is increased in amount. Urine is increased in constipation, in fear, after hysteric and epileptic attacks, in diabetes insipidus, diabetes mellitus, and chronic interstitial nephritis.

It is decreased in all febrile conditions, acute nephritis, chronic parenchymatous nephritis, cholera, and diarrheal conditions.

Color.—Urine is normally of a light amber color and transparent, but varies in health according to the concentration. The more concentrated the urine the darker is the color.

Excess of urates gives a cloudy pink or white color; mucus, pus, and phosphates cause a whitish cloud; uric acid appears as a brown powder in the bottom

of the receptacle and is known as the *brick dust sediment*; blood gives a peculiar red-brown color resembling very much the color of beef brine; bile causes the urine to take on a golden-brown hue. The presence of bile in the urine is easily detected by dropping some urine on blotting paper and then adding to the moistened area a drop or two of nitric acid. If bile be present, rings of various colors will appear.

Certain drugs alter the color of the urine. Drugs of the phenol group, as carbolic acid, salol, resorcin, creosote, etc., cause the urine to become very dark green or black. Logwood gives a crimson color; methylene blue when administered, imparts its own blue color to the urine and it is always wise to advise the patient of this change of color.

Odor.—About all that can be said of the odor of urine is that it is urinous. Urine after standing forty-eight hours or that voided in certain diseases of the bladder has an ammoniac odor.

In diabetes mellitus the urine has a sweet odor.

After administering turpentine the odor of the urine becomes like that of violets. Certain foods, such as asparagus, alter the odor.

Reaction.—Urine is normally acid, due to the acid salts of the urine and not to the uric acid. Urine may be voided alkaline from the effects of certain drugs, as potassium citrate, acetate, or bicarbonate. It is also voided alkaline in forms of cystitis.

Acid urine becomes alkaline by standing.

Specific Gravity.—This varies from 1.015 to 1.025 in health, depending on the amount of urine excreted. Urine of a high specific gravity is found in diabetes

mellitus, acute nephritis, chronic parenchymatous nephritis, fevers, and diarrhea. Urine of a low gravity is found in diabetes insipidus, chronic interstitial nephritis, after hysteric, and epileptic manifestations.

Normal Constituents of Urine.—Urine is a watery solution of certain salts of which the most important are urea, uric acid, urates, chlorids, sulphates, phosphates, and hippuric acid. A convenient way to remember the amount of urea in urine is that urine is a two per cent solution of urea.

Abnormal Constituents.—The principal abnormal constituents are albumen, sugar, bile, blood, pus, mucus, and indican.

Albumen occurs in the urine in most fevers, especially scarlet fever, diphtheria, and erysipelas; in all forms of nephritis and in eclampsia.

There are many tests to detect the presence of albumen in urine but only three of the most important will be given.

Heat and Nitric Acid Test.—Place some urine in a test tube and heat it. If albumen be present, the urine will become cloudy. This cloudiness may be due to the presence of phosphates, if due to this cause, the cloudiness will disappear on adding nitric acid.

Cold Nitric Acid Test.—In a test tube pour a little nitric acid and then allow some of the urine to flow gently on the surface of the acid. At their junction if albumen be present a white ring will form.

Potassium Ferrocyanide and Acetic Acid Test.—Add to the suspected urine ten or more drops of acetic acid and then a few drops of five per cent solution of potassium ferrocyanid. If albumen be present, a yel-

low white cloud will form. This is a very delicate test.

Sugar.—This appears in the urine in diabetes mellitus and in certain diseases of the pancreas and brain.

Fehling's Test.—Into a test tube pour some Fehling solution and boil it for a moment; then add some of the suspected urine, and if sugar be present, a brown or red precipitate is thrown down.

Fehling Solution—

SOL. I.

Copper sulphate,	Gm. 34.6
Water,	CC. 1000

SOL. II.

Rochelle salts,	Gm. 173
Caustic soda,	Gm. 60
Water,	CC. 1000

Take equal parts of each.

Böttger's Test.—Make the urine alkaline with a solution of caustic soda and add some bismuth subnitrate; then boil and the bismuth will become black if sugar be present.

Picric Acid Test.—To some alkaline urine add a little picric acid, and heat. The solution turns to a deep mahogany color if sugar be present.

Bile. (See paragraph on color of urine.)

Gmelin's Test.—Place some nitric acid in a test tube and to this add the urine carefully. If bile be present, a series of colors, as green, blue, and violet, and red, will form.

CHAPTER XXV.

SIGNS OF THE ONSET OF THE TOXIC EFFECTS OF DRUGS.

It is important that the nurse should be familiar with the action of certain drugs, so that in the absence of the physician if the full physiologic action of the drug be taking effect, further harm may be avoided.

This list includes the more common and important drugs.

Drug.	Sign.
Acetanilid.	Cyanosis, sweating, feeble pulse and cold skin.
Aconite.	Tingling sensation of the skin, vomiting, weak pulse.
Arsenic.	Puffiness of the lower eyelids, indigestion, diarrhea, headache.
Bromids.	Acneal eruption on the face and back, malaise, and indigestion.
Belladonna.	Dryness of the nose, mouth and throat; dilatation of the pupils; skin becomes red and dry; dizziness; giddiness.
Carbolic Acid.	Headache, vomiting, diarrhea, darkly colored urine.
Colchicum.	Nausea, vomiting, purging, and weak pulse.

Digitalis.	Slow pulse, which becomes rapid and irregular if the patient sit up; paleness of the face; vomiting of mucus and bile.
Ergot.	Numbness, tingling sensation, feeling of cold, vomiting, purging, paleness of the surface.
Iodids.	Running of the eyes and nose, injection of the conjunctivæ, acneal eruption, diarrhea, and salivation.
Mercury.	Salivation, diarrhea, metallic taste in the mouth, sore gums, fetor of the breath, colicky pains, and paralyses.
Nitroglycerin.	Flushing of the face, throbbing headache, fullness of the head.
Opium.	Constipation, sweating, dryness of the mouth, contracted pupils.
Quinin	Fullness of the head, buzzing and ringing in the ears, deafness, dizziness, and headache.
Salicylates.	See Quinin.
Strychnin.	Twitchings of the body, restlessness, tingling sensation, and convulsions later.
Turpentine.	Violet-like odor to the urine, red eruption, painful urination, and bloody urine.

CHAPTER XXVI.

POISONS AND THEIR ANTIDOTES.

General.—Send for a physician; empty the stomach except in cases of corrosive poisons, then give soothing and mucilaginous drinks. To empty the stomach any one of a number of measures may be instituted: Use a stomach tube or pump; irritate the pharynx with the finger or a feather; give an emetic as warm water, salt water, mustard, alum, ipecac, or zinc sulphate.

After the stomach is emptied stimulate if necessary; give the antidote if the cause of poisoning can be ascertained.

Acids.—Give limewater, magnesia, saleratus, milk, white of egg.

Alkalies.—Give lemon juice, vinegar, or dilute acid waters.

Alkaloids.—Potassium permanganate by mouth if the case is seen early; otherwise, hypodermically. Tannic acid is very good.

SPECIAL ANTIDOTES.

POISON.	ANTIDOTE.
<i>Acetanilid</i> , antipyrin, phenacetin, migraine tablets, and headache cures.	Plenty of air, hot applications and stimulation.

<i>Acid, Carbolic, salol, creosote, etc.</i>	Whiskey by mouth, soluble sulphates, as Epsom or Glauber salts, white of egg, milk, and stimulants.
<i>Acid, Hydrocyanic.</i>	Oxygen and stimulants.
<i>Amyl Nitrite, nitroglycerin and the nitrites.</i>	Fresh air, tincture of digitalis and other stimulants.
<i>Arsenic, Fowler's, Pierson's and Donovan's solutions, Paris Green, etc.</i>	Dialyzed iron, iron hydrate (mix dilute ammonia water with a solution of iron sulphate).
<i>Belladonna, atropin, and hyoseyamus.</i>	Morphin and stimulants.
<i>Bromids.</i>	Stimulants.
<i>Castor Oil Beans.</i>	Opium for the colic and stimulants.
<i>Chloral.</i>	Strong coffee and strychnin.
<i>Cocain.</i>	Stimulants and oxygen.
<i>Digitalis, squill, strophanthus, and convallaria.</i>	Saline cathartics and stimulants.
<i>Lead compounds.</i>	Sulphuric acid lemonade, milk, white of egg, saline cathartics, hot fomentations, opium for the cramps, and the iodids.
<i>Mercury.</i>	See Lead.
<i>Opium, morphin, and codein.</i>	Potassium permanganate by mouth and hypo-

	dermically, tannic acid, coffee, atropin, flagellation.
<i>Phosphorus</i> , matches, rat poison.	Oil of turpentine, Epsom salts, and stimulants.
<i>Poison-ivy</i> .	Apply fluid extract of grindelia, saleratus, or lead acetate solution.
<i>Strychnin</i> .	Chloral, bromids, and stimulants.
<i>Sulfonal</i> , trional, etc.	Sodium bicarbonate, strong coffee, and stimulants.
<i>Veratrum</i> .	Stimulants.

CHAPTER XXVII.

ENEMATA AND TOPICAL APPLICATIONS.

ENEMATA.

The uses of enemata are: To clean out the lower bowel; to supply nourishment; to introduce water into the system; for medication, both general and local.

To Clean Out the Lower Bowel.—*Soap Suds.* Agitate one ounce of soft soap with one and one-half pints of warm water.

Glycerin. Equal parts of glycerin and water; about one ounce of each.

Purgative. To one pint of soap suds (see above) add one ounce of Epsom salts, one dram to one-half ounce of turpentine, and one ounce of glycerin.

Oxgall. To the purgative enema add ten grains of powdered inspissated oxgall.

Oil. One pint of warm cotton-seed oil.

For Nourishment.

Peptonized milk,	3 ounces.
Peptonized beef-tea,	1 ounce.
Whiskey or brandy,	½ ounce.
Egg,	One.

To Introduce Water.—Useful in septicemia, shock and hemorrhage. Use normal saline solution.

For Medication.—Uses: As a local medication; because of the ill taste of certain medicines; inability to take medicines by mouth, as in coma, because of nausea and vomiting, or disease of the stomach.

Medicines most commonly given per rectum are chloral, bromids, digitalis, and whiskey.

Asafetida.—This is given for the purpose of relieving distention of the abdomen and colic. It is especially useful in the colic of infants. Take four ounces of the emulsion of asafetida (made by agitating one dram of powdered asafetida with four ounces of water) and four ounces of warm water.

Turpentine.—Also used to relieve tympanites.

Turpentine, 1 dram to 1 ounce.

Olive oil, $\frac{1}{2}$ to 2 ounces.

Warm water to 4 ounces.

Quassia.—Is used for pinworms in the rectum. To one dram of quassia add one-half pint of cold water, and allow to stand for three hours; then strain and use all for one injection.

Starch and Laudanum.—To some powdered starch add a small quantity of cold water and stir thoroughly. Then add sufficient boiling water to make a thin, clear, mucilaginous liquid. To one ounce of this solution add one to fifteen minims of laudanum.

TOPICAL APPLICATIONS.

Poultices.—The uses of poultices are chiefly two-fold: to apply heat and moisture. They relax the vessels and relieve tension and pain. The secret of making poultices consists in stirring the material into the boiling water and spreading it on hot cloths in a

thick layer. Let the poultice remain on the surface of the body until cool and then replace with another.

Flaxseed.—Onto boiling water sprinkle ground flaxseed meal and stir vigorously, adding more meal until the mixture assumes the consistency of porridge. Then spread on the cloth.

Mustard.—Into a thin flaxseed meal poultice stir ground mustard in the proportion of from one to two, to twelve, according to the age of the patient and the desired action.

Bran.—Make a small bran cushion or pillow and pour over it boiling water; then wring it dry in a towel.

Bread.—Take thick slices of bread and pour on boiling water for five minutes; then break the bread and apply as a poultice.

Another method is to let the bread simmer for five minutes in the water, when the bread becomes pulpy. Apply.

Charcoal.—This form of poultice is very useful for removing the odor of putrid ulcers. To the bread or flaxseed poultice add powdered charcoal.

Stupes.—Turpentine. Pour on a piece of flannel some very hot water; then wring the flannel dry in a towel and sprinkle with twenty to fifty drops of turpentine.

Another method is to add to one quart of boiling water one teaspoonful of turpentine; into this immerse the flannel and wring dry in a towel.

Chloroform and Turpentine.—Same as the turpentine stupe, adding five to fifteen drops of chloroform.

CHAPTER XXVIII.

ANTISEPTICS.

Bichlorid of mercury is used in watery solutions of from one to five hundred, to one to one thousand. The most common dilution is the latter. This solution is used for the disinfection of the hands and tissues. For irrigating or for use in the abdomen weaker solutions, as from one to two thousand to one to ten thousand. Bichlorid is liable to coagulate the albumen of the tissues and thus prevent deep disinfection.

Bichlorid of mercury should not be used to sterilize metallic instruments as it corrodes them and destroys the edges of sharpened instruments.

Toxic effects may result from the absorption of mercury through the skin. The signs are salivation, sore gums, foul breath, abdominal colic, diarrhea, etc.

In preparing solutions of the bichlorid of mercury it is best to add common salt, ammonium chlorid or citric acid, as these prevent the decomposition of the bichlorid.

Carbolic acid is next in importance. It is used in solutions ranging from one to ten to one to one hundred. A one to twenty solution is most generally used

for sterilizing instruments. A one to one hundred solution is used for packs and irrigation.

Signs of carbolic acid poisoning are headache, dizziness, vomiting, painful urination, dark colored urine, and diarrhea. Local gangrene has resulted from the application of weak solutions of carbolic acid.

Potassium permanganate is used for douches in a solution of one to one thousand.

Iodoform is used especially in tubercular disease as iodoform gauze, emulsion, or powder.

Formaldehyd in two per cent solutions for sterilizing the hands or instruments.

Hydrogen peroxid used in the strength dispensed or diluted, is especially useful in cleaning pus cavities.

Creolin is used in two and four per cent solutions for douches and irrigation.

Boric acid as a weak antiseptic for the eyes, nose and bladder.

Lysol, to be used as creolin.

Aristol has the same use as iodoform and is nearly free from odor.

Chlorinated lime is useful for disinfecting the excreta of the body.

TABLE OF SOLUTIONS.

To one pint of water or the solvent used, add the following quantities of the chemical or drug.

For a 1 to 5000 or a 1-50 per cent solution use $1\frac{1}{2}$ grains.

For a 1 to 2000 or a 1-20 per cent solution use $3\frac{2}{3}$ grains.

For a 1 to 1000 or a 1-10 per cent solution use $7\frac{1}{3}$ grains.

For a 1 to 100 or a 1 per cent solution use 73 grains.

For a 1 to 20 or a 5 per cent solution use 365 grains.

For a 1 to 10 or a 10 per cent solution use 730 grains.

Note.—To one ounce of water add one dram of chemical, and one dram of this solution when added to one pint of water will give approximately a one to one thousand solution.

CHAPTER XXIX.
ABBREVIATIONS, WEIGHTS AND
MEASURES.

ABBREVIATIONS.

Aa.—Of each.
A. C.—Before Meals.
Aq.—Water.
Aq. Bul.—Boiling Water.
Aq. Dest.—Distilled Water.
Aq. Ferv.—Hot Water.
Aq. Font.—Spring Water.
Bene.—Well.
B. I. D.—Twice a Day.
C.—With.
Cochl.—Spoonful.
Cras.—To-morrow.
D.—Dose.
Ft.—Make.
Gr.—Grain.
Gm.—Gram.
Gtt.—Drop.
M.—Minim.
O.—Pint.
P. C.—After Meals.
Q. 4. H.—Every four hours.

Q. S.—Sufficient Quantity.
 Sine.—Without.
 Stat.—Immediately.
 T. I. D.—Three Times a Day.
 IV. I. D.—Four Times a Day.

WEIGHTS AND MEASURES.

Apothecary's Weight.

60 Minims, 1 Dram.
 8 Drams, 1 Ounce.
 16 Ounces, 1 Pint.

Troy Weight.

20 Grains, 1 Scruple.
 3 Scruples, 1 Dram.
 8 Drams, 1 Ounce.

Metric Values.

0.0081 Gram, 1-8 Grains.
 0.056 Gram, 7-8 Grains.
 0.1 Gram, 1.54 Grains.
 0.5 Gram, 7.71 Grains.
 0.9 Gram, 13.89 Grains.
 1. Gram, 15.43 Grains.
 1. CC., 16.23 Minims.

Equivalents.

1 Grain, 0.065 Grams.
 2 Grains, 0.13 Grams.
 5 Grains, 0.324 Grams.
 15 Grains, 0.972 Grams.
 480 Grains, 31.103 Grams.
 1 Minim, 0.0616 CC.
 2 Minims, 0.1232 CC.
 5 Minims, 0.3080 CC.

Equivalents.

- 60 Minims, 3.7 CC.
- 480 Minims, 29.6 CC.
- 1 Pint, 0.473 Liters.
- 1 Quart, 0.946 Liters.
- 1 Gallon, 3.784 Liters.
- 1 Liter, 33.8 Ounces.

Domestic Measures.

- 1 Teaspoonful, 1 Dram or 4 CC.
- 1 Dessert spoon, 2 Drams or 8 CC.
- 1 Table spoon, 4 Drams or 16 CC.
- 1 Wine glass, 2 Ounces.
- 1 Tea cup, 5 Ounces.
- 1 Tumbler, 11 Ounces.

Thermometric Equivalents.

212.° Fahrenheit	— 100.°	Centigrade.
120.°	“ — 49.°	“
100.°	“ — 37.77°	“
98.6°	“ — 37.°	“
80.°	“ — 27.°	“
60.°	“ — 16.°	“
50.°	“ — 10.°	“
32.°	“ — 0.°	“
0.°	“ — 17.78°—	“

To reduce Centigrade to Fahrenheit, multiply by nine and divide by five, and add thirty-two.

To reduce Fahrenheit to Centigrade, subtract thirty-two, multiply by five, and divide by nine.

CHAPTER XXX.

MISCELLANEOUS NOTES.

The Stools.—*Green.* In gastro-intestinal disease of children, excessive flow of bile, after taking calomel.

Black.—From altered blood, after certain foods as spinach, huckleberries. Certain medicines as iron, bismuth, tannin, and charcoal.

Yellow.—In typhoid fever, certain drugs as senna, santalin, and rhubarb.

Red.—After administering logwood.

Watery.—In profound diarrheas, cholera, poisoning by mercury, arsenic, and antimony.

Mucous.—In inflammation of the colon, dysentery, after prolonged constipation.

Fatty.—In faulty pancreatic digestion; in the absence of bile, as in obliterative jaundice; after the ingestion of an excessive amount of fat.

Purulent.—From ruptured abscesses of the intestinal tract, fistula in ano, dysentery, suppurative enteritis.

Bloody.—In typhoid fever, ulcers of the intestines, dysentery, intussusception, intense anemia, scurvy, acute enteritis.

Expectoration.—*Mucous.* It is glairy and clear, like the white of an egg, and occurs in acute bronchitis, asthma, and edema of the lungs.

Purulent.—In ruptured empyema, abscess of the lung, ruptured abscesses of the mediastinum and liver.

Mucopurulent.—In bronchitis, lobar pneumonia, tuberculosis.

Serous.—In edema of the lungs.

Bloody.—In beginning pneumonia, tuberculosis, cancer of the lung, congestion of the lung following heart disease.

Pulse.—Rapid. . In fevers, tuberculosis, infections, exophthalmic goiter, shock, rheumatoid arthritis, locomotor ataxia, valvular heart disease, certain drugs.

Slow.—In disease of the heart muscle, as fatty degeneration; in jaundice; brain tumor; basal meningitis; during the convalescence of pneumonia and typhoid fever; after drugs, as digitalis, aconite, opium, and strophanthus .

Temperature and Pulse Ratio.

Pulse of 72 corresponds to 98.6° F.

Pulse of 80-90 corresponds to 100° F.

Pulse of 100-115 corresponds to 102° F.

Pulse of 120-130 corresponds to 104° F.

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